

SMITHSONIAN INSTITUTION

Fiscal Year 1991

Justification of Estimates of Appropriations To the Office of Management and Budget



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September 1989

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SMITHSONIAN INSTITUTION

FISCAL YEAR 1991

Justification of Estimates of Appropriations

To the Office of Management and Budget

SMITHSONIAN INSTITUTION

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 Office of Accounting and
 Financial Services
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 Office of Risk Management
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Management Analysis Office
 Office of Equal Opportunity
 Office of Facilities Services
 Office of Architectural History
 and Historic Preservation
 Office of Design and Construction
 Office of Environmental Management
 and Safety
 Office of Plant Services
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International Environmental Science
 Program
 Joseph Henry Papers
 National Zoological Park•
 Office of American Studies
 Office of Fellowships and Grants
 Office of Quinquennial Programs
 Smithsonian Astrophysical Observatory
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 Smithsonian Institution Archives
 Smithsonian Institution Libraries
 Smithsonian Tropical Research Institute

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Anacostia Museum•
 Archives of American Art•
 Arthur M. Sackler Gallery and
 Freer Gallery of Art•
 Conservation Analytical Laboratory•
 Cooper-Hewitt Museum•
 Hirshhorn Museum and Sculpture Garden•
 International Gallery
 National Air and Space Museum•
 National Museum of African Art•
 National Museum of American Art•
 Renwick Gallery•
 National Museum of American History•
 National Museum of Natural History•
 National Museum of Man•
 Museum Support Center•
 National Portrait Gallery•
 Office of Exhibits Central
 Office of Horticulture
 Office of Museum Programs
 Office of the Registrar
 Smithsonian Institution Traveling
 Exhibition Service

Assistant Secretary for PUBLIC SERVICE•

National Science Resources Center
 Office of Wider Audience
 Development
 Office of Conference Services
 Office of Elementary and Secondary
 Education
 Office of Folklife Programs
 Office of Interdisciplinary
 Studies
 Office of Public Affairs
 Office of Telecommunications
 Smithsonian Institution Press
 Smithsonian Magazine
 Air and Space Magazine
 Visitor Information and Associates'
 Reception Center

Assistant Secretary for EXTERNAL AFFAIRS•

Office of Membership and Development•
 Smithsonian National Associate Program
 Office of Governmental Relations•
 Office of International Relations
 Office of Special Events
 Smithsonian Resident Associate
 Program

SMITHSONIAN INSTITUTION

FISCAL YEAR 1991 ESTIMATES OF APPROPRIATIONS

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SMITHSONIAN INSTITUTION
FY 1991 BUDGET REQUEST
(\$000's)

<u>APPROPRIATION</u> <u>ACCOUNT</u>	<u>FY 1990</u> <u>BASE</u>	<u>FY 1991</u> <u>REQUEST</u>
Salaries and Expenses	\$231,561	\$277,975
Instrumentation	2,176	5,794
Repair and Restoration	26,653	35,000
Construction	10,000	61,490
Zoo Construction	<u>6,500</u>	<u>19,100</u>
 TOTAL	 \$276,890	 \$399,359

INTRODUCTION

Visitors to the Smithsonian are consistently impressed by its numerous buildings, its well-maintained gardens, its exhibit halls, its theaters and lecture halls, and its several public cafeterias, including the recently completed Wright Place in the National Air and Space Museum. The Institution's managers constantly maintain, renovate, improve, and replace these facilities to reverse the ravages of time and heavy use. However, the Institution recognizes its responsibility to reinvest not only in the infrastructure of bricks and mortar but also in the infrastructure of programs conducted within these building, halls, and theaters.

FY 1991 is a year in which the Smithsonian plans positive and sustained re-investment in the foundation to obtain greater yields in the increase and diffusion of knowledge among the American people and the peoples of the world.

FY 1991 BUDGET PRIORITIES

The Smithsonian Institution's request for all operating and capital budget accounts in FY 1991 totals \$399.4 million, or \$122.5 million over the FY 1990 base. Of this amount, \$114.1 million represents resources that the Institution needs to reinforce its programmatic, operational, and facilities infrastructure for its "current services" and to prepare the Institution to move into the 21st century; only \$8.4 million represents resources for new program initiatives and services.

SALARIES AND EXPENSES:

The Salaries and Expenses (S&E) request of \$283.8 million and 4,839 workyears represents an increase of \$32.6 million (net of redirections) over the OMB planning target. The Institution's various program and operating infrastructure requirements were the central theme in its budget deliberations for FY 1991 and represent \$24.9 million of the request. The Institution has, however, selected two principal themes for new program initiatives--Global Change Research and Cultural Pluralism--as exceptions, since each responds to a clear national and public imperative. These initiatives represent \$8.4 million of the request.

REINFORCEMENT OF THE PROGRAMMATIC AND OPERATING INFRASTRUCTURE:

Review of the resource requirements necessary to carry out the public trust and to achieve the Institution's goals make it evident to Smithsonian management that the majority of these requirements do not represent new or expanded service levels. Instead, most of these requirements essentially constitute a growing backlog of resource deficiencies that have reached critical proportions. These deficiencies now jeopardize the Institution's ability to manage the National Collections it holds in trust for the American people and its ability to increase knowledge and understanding among future generations. In this budget, the Institution has grouped like deficiencies throughout various Smithsonian bureaus and offices into several broad categories in an effort to portray the magnitude of these deficiencies. Table 1 provides a summary of the \$24.9 million and 324 workyears the Institution is requesting for various infrastructure requirements and shows the remaining need the Institution intends to address in future budget years. Following the table is a category-by-category explanation of the importance of addressing these catch-up requirements in FY 1991.

TABLE 1
RESOURCES REQUESTED FOR FY 1991 FOR INFRASTRUCTURE
COMPARED TO THE UNFUNDED BACKLOG OF REQUIREMENTS

Infrastructure Bundle	FY 1991 Request		Unfunded Requirements Backlog	
	FTE	\$000	FTE	\$000
Conservation of Library and Archival Collections	12	\$ 460	77	\$5,707
Reinstallation of Permanent Exhibit Halls	1	1,398	15	3,999
Library and Collections Acquisition	1	258	0	2,330
Collections Management	77	7,466	32	1,767
Human Resource Management	9	481	9	613
Clerical Support Staff	12	295	28	847
Specialized and Technical Staff and Support Costs	74	2,961	70	2,971
Laboratory and Scientific Equipment (Non-Computing)	0	1,356*	2	1,150*
Computers (Hardware)	0	613	3	1,637
Information Systems	38	4,601	13	3,380
Audit Deficiencies	10	365	8	313
Space Deficiencies	1	441	0	1,296
Facilities Maintenance Deficiencies	42	1,990	95	6,020
Health and Safety of Staff and Visitors	9	580	9	725
Security of Facilities and Collections	38	1,615	98	4,912
	-----		-----	
Total	324	\$24,880	459	\$37,667

* Excludes increases requested for the Major Scientific Instrumentation account.

Conservation of Library and Archival Collections - The Smithsonian's archives and libraries--books, documents, films, photographs, and recordings--are national resources. Their words and images are fuel to generate energy in the powerhouse of knowledge and understanding. Some are renewable; many unique ones are not. All are fragile; all deteriorate with use. Conservation and sustained investment are essential to maintain them. Replaceable items must be replaced; unique ones must be preserved. If the Smithsonian does not replace and preserve these items, it ensures and accelerates their deterioration, destruction, and depletion. Deferred investment simply intensifies a growing national debt of future replacement and renewal costs. Conservation is not a one-time need; it represents an essential sustained capital investment. The relative neglect and less than optimum investment in these resources over the past decade makes FY 1991 a critical turning point. Each year that the investment is not up to optimum levels accelerates cumulative deterioration, increases total cost and total lost, and makes it evermore difficult to recover these collections.

For FY 1991, the Institution is requesting 12 workyears and \$460,000 to fund the on-going conservation of library and archival collections. Bureaus have identified an additional unfunded need of 77 positions and \$5.7 million per annum.

Reinstallation of Permanent Exhibit Halls - The Smithsonian receives visitors from all over the world who come to be enlightened, educated, and inspired. The Smithsonian is the "National" museum and, as such, has a public responsibility to reflect current concerns and perceptions of the Nation and the world.

After years of good service, "permanent" exhibitions become obsolete, both in their interpretive or presentation strategies and their interest to the public. Many of the Institution's exhibitions have long outlived the timeliness and accuracy of their content, and funding for upgrading or replacement has not been available. Moreover, few Smithsonian exhibitions have had the funding to incorporate new exhibition techniques, such as laser discs and computers, that increase understanding among a museum-going constituency which increasingly has experience in these methods and expectations about their use. These new technologies also enable museums to explain exhibits in less space by reducing the area devoted to lengthy descriptive labels.

In order to revitalize exhibits that are now decades old and to increase the accuracy of their content, the Smithsonian is asking for a no-year appropriation of \$1.4 million in FY 1991. This amount will allow two museums to increase their exhibition base funding for an extended program of phased replacement of the oldest exhibit halls. These funds will support technical upgrade, intellectual refurbishment, or total replacement of existing, outdated "permanent" exhibitions within the National Museum of Natural History and the Freer Gallery of Art. This funding will guarantee that the information and presentation of Smithsonian exhibits reflect contemporary interests and achievements. In future years, the Institution will request an additional \$4 million per annum to undertake the reinstallation of the various exhibit halls that are outdated.

Library and Collections Acquisition - Modern researchers are dependent on the availability of published results from colleagues. The most utilized and timely source of such information is scholarly journals. The more than 40,000 journals in the sciences reflect the incredible degree of specialization in the scientific fields alone. Thus, an active scholar in a scientific discipline (e.g., molecular biology) can no longer simply read one or two of the scores of specialized journals available.

To scientists and scholars, immediate access to the full range of scholarly literature is as important as research equipment.

The relative weakness of the dollar against foreign currencies has resulted in the escalation of subscription costs for many of the foreign journals upon which Smithsonian scientists and scholars rely. The Institution has in recent years attempted to maintain its current level of service by cancelling some of the lesser-used journals, taking advantage of interlibrary loans, and utilizing private document delivery services. Although the Institution has vigorously pursued these options, journals dealing with such pivotal international issues as global change and molecular genetics are not a regular part of the Institution's journal base. Hence, the Institution needs new resources to ensure that its scholars have regular access to information in those fields in which advances are occurring. The Smithsonian Institution Libraries manages the collection of periodicals for the entire Smithsonian community and for various related agencies represented within the Institution, including the United States Geological Survey, Fish and Wildlife Service, Department of Agriculture, and National Oceanic and Atmospheric Administration. Inaccessibility of scholarly journals to Smithsonian staff is a significant impediment to the Institution's ability to conduct research in critical areas of national interest ranging from global warming to embryo transfer and space research.

For FY 1991, the Institution is requesting \$258,000 to address deficiencies in library acquisitions. Bureaus have identified a remaining backlog of \$2.3 million needed annually to acquire other collections resources.

Collections Management - The Smithsonian is not the "Nation's attic" as much as it is the "Nation's treasure chest." The care of collections is a sacred responsibility to the American public now and for future generations. With proper care, the National Collections can continue to offer future scholars valuable opportunities for study that cannot be envisioned today.

However, collections care is technical, tedious, and never complete, for the standards of care continuously increase as the museum profession learns more about the composition of objects and the effects of environment. The Institution has spent considerable sums to improve the registration, storage, restoration, and conservation care of objects and is proud of demonstration projects such as the Collections Information System (CIS) and the Museum Support Center. Yet, although the Institution is moving briskly along on some fronts, responsibility for the care of collections escalates as they grow and age. Research on new preservation techniques and related advancements and automation make collections care an increasing and increasingly expensive endeavor. For FY 1991, the Institution is requesting a no-year appropriation to continue the equipping of and move of collections to the Museum Support Center. The Institution must begin installation of collections into the storage units that will be ready to receive them. The Institution also must make technical improvements in the management of collections in the National Museum of American History and the National Portrait Gallery; make progress on the herculean conversion of the records of the National Museum of Natural History; and take advantage of the closing of the Freer Gallery of Art to bring its collections storage and conservation systems up to modern standards. To fulfill public responsibilities to the "Nation's treasures," the Smithsonian must maintain a program of adequate care for the collections entrusted to it.

For FY 1991, the Institution is requesting \$7.5 million and 77 workyears for

needs in collections management. An additional \$1.8 million and 32 workyears annually has been identified to address collections management deficiencies.

Human Resource Management - In its May 1989 report, Improving Personnel Operations and Policies, the National Academy of Public Administration (NAPA) urged that, for the Smithsonian Institution's long-term organizational health, its personnel office be transformed from a "procedures and process" operation to an organization that provides leadership in managing the Institution's human resources. To that end, the Academy recommended that the Office of Personnel Administration be responsible for human resource planning and budgeting, personnel policy development and administration, management and supervisory training, oversight, and related information systems. The Academy went on to reaffirm that with these responsibilities comes greater effectiveness and accountability.

To achieve prerequisite efficiency and effectiveness, the report made many recommendations pertaining to day-to-day operations. In addition, the Academy pointed out that the ratio of employees served to personnel staff was well over the ratio recommended by the President's Council on Management Improvement. This finding confirmed the general perception both within and outside the personnel office that it is understaffed.

To implement the recommendations in the NAPA and other reports on the Institution's human resource management infrastructure, the Institution seeks additional resources of 9 workyears and \$481,000 in the FY 1991 budget. The Institution will seek an additional 9 workyears and \$613,000 in future years to meet the remaining requirements for human resource management.

Clerical Support Staff - Over the past years, growth of public demands and programs at the Institution has resulted in a deficiency in clerical support. Productivity in many programs would increase measurably if additional clerical support were available to scientists, curators, and other museum specialists. The shortage of clerical support slows the Institution's progress in addressing critical programmatic imperatives such as global environmental change research and cultural diversity.

The shortage in clerical support is most evident at the Smithsonian Tropical Research Institute (STRI). As the Institute expands its biological research in forest dynamics and canopy biology, scientists will require additional clerical support so they can focus on research rather than spend time on clerical tasks. STRI has identified clerical support needs totaling 19 workyears and \$500,000 and must correct this shortage in the near future. However, shortages in clerical support exist throughout the Institution. Other bureaus reporting shortages include the Joseph Henry Papers, Smithsonian Environmental Research Center, National Science Resources Center, Office of International Relations, Office of Government Relations, and other administrative and support areas. For FY 1991, the Institution is requesting 12 workyears and \$295,000, but it will require an additional 28 workyears and \$847,000 annually in future budget years to eliminate its clerical support deficiency.

Specialized and Technical Staff and Support Costs - Among the Institution's major areas of concern over the past decade has been the closure of selective gaps in its research programs through the recruitment of new professional staff. A related objective has been to provide an adequate level of technical assistance to members of the professional staff so they can be more efficient and productive in the advancement of scholarship and public programming. For too long, many of the highly trained staff within the Institution have had to perform functions best suited to technicians,

functions that divert them from their primary responsibilities. In addition to dealing with these deficiencies in existing programs, the Institution must also address the need to staff newly constructed or recently renovated facilities. The teaming of scholars with a proficient technical support staff is essential for the Institution to meet the many challenges facing the Nation in the next few years.

For FY 1991, the Institution is requesting 74 workyears and \$3.0 million for additional technical personnel and associated costs. Bureaus have identified a remaining need of 70 workyears and \$3.0 million annually. Examples of the programs needing technical staff and support costs are:

- Biomedical Technology: The National Zoological Park (NZP) is developing advanced fields of biomedical technology with particular emphasis on the role of genetics in animal reproduction and physiology. The world's main hope for saving many species of animals from total extinction is the pioneering work performed at NZP in the related areas of embryo transfer and cryobiology.
- Museum Research: In the domain of museum research, the Institution plans a more vigorous professional presence at the National Air and Space Museum (NASM), the National Museum of American History (NMAH), the Cooper-Hewitt Museum, and the National Museum of American Art, to take advantage of new collections that have entered their possession within the past five years. The study, preservation, and exhibition of these specialized collections demand a skilled and competent staff. For example, NASM's significant collections in avionics, currently the focus of its Computer Gallery, and the soon-to-be-opened Computer Gallery at NMAH require staffing within a field that has only recently emerged as a unique sphere of scholarship. In the arts, the Cooper-Hewitt Museum requires additional staff to promote its extraordinary decorative arts collection. The National Museum of American Art requires positions at both the technical and professional levels to meet the pressing need for the cataloguing, study, and exhibition of major 19th- and 20th-century holdings in the American visual arts.
- Research and Public Programming: As steward of the National Collections and important natural research areas, the Institution commits itself to the proper guardianship of its holdings as well as to the research and public programming that derive from these unique resources. The selective addition of staff will allow the Smithsonian to meet these trust obligations on behalf of the world's citizens, advancing scholarship and public understanding with the prudence and discernment for which the Institution is renowned. Within the National Museum of Natural History (NMNH), the Institution's largest biological bureau, the total ratio of technicians to research staff has been woefully inadequate for more than a decade. The present request seeks to redress this imbalance in the interests of facilitating and improving scholarship in global change research and other significant fields of national interest.
- Theoretical Astrophysics: At the Smithsonian Astrophysical Observatory (SAO), filling gaps in the field of theoretical astrophysics is crucial to supporting advances in ground-based and space-borne astronomy. In addition, an infusion of more junior staff into the ranks of the research community will ensure continuous representation of the latest thinking within the varied fields that constitute astrophysics.
- Global Change: At the Smithsonian Tropical Research Institute (STRI), the opening of a new laboratory on Barro Colorado Island, with its research programs

on global change, requires new technical assistance as well as increased professional strength. For the past two decades, STRI's scholarly community has had virtually no technical support staff. The Institution must take remedial action to correct this deficiency. New staff, and the attendant costs, will sustain and reinforce the vital study of global change and tropical rain forest canopy biology.

Laboratory and Scientific Equipment - The Smithsonian is not exempt from the difficulties faced by other research institutions in overhauling an obsolete research infrastructure. The availability of up-to-date research equipment is a basic necessity for scholars to remain competitive with their peers worldwide. In this respect, one significant difference between the Institution and universities is its inability to obtain National Science Foundation funding for this purpose. Thus, direct Federal funding is essential. Failure to obtain necessary equipment will seriously impair the Institution's ability to meet crucial objectives in global environmental research. In the end, new facilities and talented scholars will be left without the opportunity to make full use of their skills.

For the past six years, the Institution has placed major emphasis on improving its research facilities. It is not sufficient, however, to provide scholars with new or renovated space without also supplying them with the attendant tools of their trade: research equipment. All the Institution's research bureaus and research support offices have prepared equipment acquisition and replacement plans detailing their requirements over the next decade. In the process it has become clear that, in an era in which research equipment has become increasingly sophisticated and is rapidly superseded by technological advances, much of the Institution's equipment inventory is obsolete. The Institution has systematically begun to rebuild the critical infrastructure requirements of laboratory and scientific equipment in selected areas.

A major portion of the Institution's request for additional funding for research will enable the Smithsonian Astrophysical Observatory (SAO) to continue two important projects involving the development of new and the reconfiguration of existing instrumentation. The OMB target and the Smithsonian request for FY 1991 include \$4.4 million for these two projects. The construction of the submillimeter telescope array will allow SAO scientists to study more effectively the formation of stars and planetary systems and the puzzling processes taking place in the cores of galaxies and quasars. The conversion of the Multiple Mirror Telescope (MMT) to a telescope with a single 6.5-meter diameter mirror will enable SAO to gather data on objects much fainter than is currently possible and to study more than twice as much of the universe.

In FY 1991, the Institution must also acquire equipment for the new Barro Colorado Island laboratory, where existing equipment is more than 20 years old. The National Zoological Park requires equipment to take advantage of the rapid advances in the biomedical field for the study and care of endangered species. The Conservation Analytical Laboratory requires resources to replace equipment purchased or obtained more than a decade ago, some under excess property guidelines. The Institution also requires new equipment to complete the furnishing of its modern laboratory at the Museum Support Center in support of molecular biology research. These requests total \$1.4 million in FY 1991; in future years the Institution will require an additional \$1.1 million annually to ensure it has an adequate base to replace its scientific equipment on a regular basis.

Computers - The computer is an indispensable tool for the production and dissemination of research. Scholars increasingly use computers to communicate through networks that provide bibliographic information, store research data, and prepare, or even publish, manuscripts. Due to limited resources, the Smithsonian has been unable to realize fully the potential of computer technology for increasing efficiency and productivity in the scholarly realm. The Institution now seeks to purchase, install, and create effective computer networks for all of its scholars, not just in those few bureaus that have made some progress in this area. The Institution is seeking to replace and upgrade computers, software, and networks for bureaus already using computer technology. The Institution must also implement a computer acquisition program for small bureaus that lack even rudimentary computing equipment.

The Institution has a compelling need to bring its research capabilities fully into the computer age. Failure to achieve this objective will result in a significant retardation of the Institution's fundamental trust responsibility. Furthermore, that failure would undoubtedly be reflected in the caliber of the Institution's public programs, since it is research of high quality that underpins all such activities.

For FY 1991, the Institution is seeking Federal funding of \$613,000 for computers. Bureaus have identified further computer needs that will require an additional \$1.6 million.

Information Systems - In early 1989, the Office of Information Resource Management held an Institution-wide planning symposium to assess the state of Information Resource Management (IRM) in the Institution and to initiate an ongoing process for IRM planning and development. Through formal presentations, discussion groups, and critiques, users and providers of information services gained a comprehensive overview of information handling and services. In the course of discussion, attendees identified an urgent need to focus IRM efforts on the solution of the most pressing systems development and service delivery requirements, including systems for the management of museum specimens and objects and bibliographic and archival materials. It also became clear that the resources available for information-related services are inadequate to provide the up-to-date technologies, systems, and communications necessary for the conduct of Institutional activities.

In the short term, the Institution must allocate resources to meet three objectives:

- to allow access to collections management, research, public service, and administrative information;
- to develop, design, implement, and maintain computer systems;
- to define how information technologies can be used to meet established goals.

The unique role of the Smithsonian in education and research is in jeopardy. Its accessibility as a resource to researchers worldwide and its public status are diminishing. Increasingly complex research, education, and business demands for information exceed the capabilities of the Institution's existing technologies. To reclaim its position as a leader in research, education, and collections and to remain accountable as a public trust, the Smithsonian must have the resources to utilize appropriate advanced information technologies.

For FY 1991, the Institution is requesting Federal funding of 38 workyears and \$4.6 million to address its most pressing needs for information systems. Bureaus have identified a backlog of an additional 13 workyears and \$3.4 million for other systems.

Audit Deficiencies - The Smithsonian maintains a strong program of audit and review of its financial and program activity. In addition to the triennial review of internal controls, an outside certified public accounting firm performs an annual financial audit. The Smithsonian Office of the Inspector General performs financial and program audits on a regular cycle, and the Government Accounting Office and other agencies perform special audits from time to time.

These reviews and audits identify deficiencies in internal controls, policies, and procedures; in compliance with internal and external requirements; and in meeting the needs of the public. Additionally, they identify areas where efficiency improvements are possible. By implementing the recommendations from these audits and reviews, the Smithsonian improves internal controls; limits the potential for waste, fraud, and abuse; and becomes more effective in meeting public needs and more efficient in carrying out its programs. Implementing recommendations to eliminate such deficiencies represents an investment with an expected and important return.

For FY 1991, the Institution is requesting 10 workyears and \$365,000 to eliminate its most critical audit deficiencies. Bureaus have identified a remaining less critical backlog of 8 workyears and \$313,000 needed annually to eliminate all known audit deficiencies.

Space Deficiencies - Historically, the Institution has housed administrative and other central support functions in museum buildings on the Mall. With the growth of collections, research, and public programs, however, space in museums has gradually become very limited. Increasingly, the Institution has grown to rely on leased space (in buildings convenient to Mall activity) to house administrative functions. There are two primary centers of off-Mall support: L'Enfant Plaza for administrative functions and the Service Center on North Capitol Street for light industrial, warehouse, and technical support.

The Institution presently leases 75,000 square feet of space at L'Enfant Plaza for accounting, personnel, publications, design and construction, and procurement and contracting functions. The Institution uses both Federal and Trust resources to pay for the rental space in direct proportion to the number of Civil Service and Trust employees in each office. The Institution anticipates additional need for leased space as buildings on the Mall must accommodate growth in public programs.

The Institution's Service Center on North Capitol Street contains about 165,000 square feet of space. The Institution needs a Service Center of approximately 350,000 square feet to house all related activities in one place and to free space on the Mall for public programs. The Institution is examining options for a lease-purchase agreement on a suitable facility. The Institution will require additional funding for an alternative facility, possibly as early as FY 1993.

For FY 1991, however, the Institution requires \$441,000 to pay the costs of additional leased space for its current programs.

Facilities Maintenance Deficiencies - The Smithsonian owns, operates, repairs, and maintains more than five million square feet of space in more than 200 buildings. These buildings range in age from new to more than 140 years old, and many appear on

the registers of historic landmarks. Many are, in fact, among the most precious "artifacts" the Smithsonian holds in trust for the Nation. The Smithsonian must operate and maintain these buildings to ensure the continued functioning of its many diverse programmatic activities and to preserve them for use by future generations.

The Institution has identified a backlog of essential maintenance and repair projects currently totaling \$195 million. By increasing staff and equipment for facilities maintenance, the Institution seeks to slow the rate of deterioration of its buildings and thus slow the rate at which new repairs add to the backlog. Additional staff for facilities maintenance will also ensure timely completion of the Repair and Restoration of Buildings projects. Custodial staff will improve the cleanliness of the interiors, and gardeners will maintain the grounds around the buildings in the manner appropriate for important and highly visible public buildings in the Nation's Capital. Support staff for the Education Center in the Quadrangle will ensure maximum utilization of this important resource for public programs.

For FY 1991, the Institution is requesting Federal funding of 42 workyears and \$1,990,000. Bureaus have identified a remaining annual requirement of 95 workyears and \$6.0 million.

Health and Safety of Staff and Visitors - The Institution is concerned about the health and safety of its staff and visitors. In recent years, Congress has allocated resources for a solid foundation for an environmental management and safety program. Staff members are now available to assess environmental and safety hazards of the physical plant and to identify necessary changes to buildings or work practices. The Institution needs resources, however, to carry out these changes, particularly at the bureau level. Staff of the Office of Environmental Management and Safety is developing programs required by law or regulation to inform and protect employees who work with dangerous chemicals or are exposed to hazardous conditions and to identify fire or safety risks in the workplace and public areas of Smithsonian buildings. Additional resources will allow coordination of these efforts at the bureau level and ensure that the laboratories and offices throughout the Institution carry out the safety programs. Without additional resources, the Smithsonian will fail to comply with numerous life safety codes promulgated to ensure a healthy and safe environment in which to work and conduct public programs. A delay in granting these resources could place many employees and visitors in jeopardy.

An occupational health program is also in place, but the Institution needs additional resources to meet statutory obligations to staff. Presently the Smithsonian is unable to meet several mandatory requirements for health monitoring of all employees exposed to hazardous materials or working under extreme physical conditions. Additional funds will increase the number of physical examinations and will streamline the medical records essential to such a program to make them more useful in a number of contexts. The Smithsonian has established programs in wellness and substance abuse, but these programs also require increased support. Additional resources will make counseling services available to more employees whose personal problems are interfering with their well-being and job performance. Without these resources, the Institution will fail to meet the government standard to occupational health care for its more than 5,000 employees.

For FY 1991, the Institution is requesting Federal funding of 9 workyears and \$580,000 for health and safety measures. The Institution requires an additional 9 workyears and \$725,000 annually to correct all known health and safety deficiencies.

Security of Facilities and Collections - The Smithsonian has more than 130 million items in its collections, on display in exhibitions or in storage. In addition to the very high intrinsic value of objects such as gems and coins, most of the objects are irreplaceable examples of human experience and achievement as well as global development and change. The collections are stored within the museum buildings on the Mall, at specially designed storage facilities in Suitland, Maryland, and in some leased warehouses in Washington, D.C., Virginia, and elsewhere around the United States. In addition, the Institution has research facilities in a number of remote locations in Panama and Arizona. Security in Smithsonian facilities consists of a complex combination of alarm systems throughout the buildings and physical surveillance by guards at entrances and in public galleries.

In the past several years, serious erosion of base resources to support the security program has undermined the Institution's ability to provide adequate protection for its collections and facilities. In recent years staffing shortages have caused the periodic closing of exhibit galleries when guards were not available for full coverage. This solution interferes with the public's enjoyment of the exhibitions and activities presented at the various museums and with achievement of the Smithsonian's mission to increase and diffuse knowledge. The alternative is a reduction in security coverage, which places the collections and public property at an unacceptable level of risk of loss or irreparable damage. The Office of Protection Services must hire additional guards for galleries, entrances and exits, and grounds and must replace or maintain communications and security systems vital to the effectiveness of the security force. The political situation in Panama has also diverted Mall-based security resources to protect the Smithsonian Tropical Research Institute staff and properties.

For FY 1991, the Institution is requesting 38 workyears and \$1.6 million to improve the security of staff and collections. The remaining backlog in security totals 98 workyears and \$4.9 million annually.

INITIATIVES IN RESPONSE TO NATIONAL IMPERATIVES:

Global Change Research - During the past three years, countless studies and testimony have been presented before Congress and scientific groups concerning the effects of natural and human activities on the global environment. A recent report by the National Academy of Sciences serves as the best summary of the current situation. Rapidly evolving changes in the global environment have captured the attention of scientists, policymakers, and citizens around the world:

- the increase of atmospheric greenhouse gases such as carbon dioxide, methane, and the chlorofluorocarbons;
- the expected consequent changes in global climate and sea level;
- a global depletion of stratospheric ozone, and the observed "antarctic ozone hole";
- widespread desertification and reduction in the diversity of plant and animal species;
- extensive damage to mid-latitude forests;
- acidification of lakes and soils in many regions.

At the least, these changes have far-reaching and potentially disruptive implications for the world's natural resources. In the worst case, the changes collectively threaten the life-support system of the earth. The problem of global environmental change is crucial and urgent.

The Smithsonian Institution is ideally positioned to undertake important research initiatives in the field of global change by building upon its current programs. With more than 150 scientists in a variety of biological and physical science disciplines (coupled with its stewardship over large, protected areas in both the tropical and temperate zone), the Institution can undertake comparative studies to assist in understanding the complexities of this global problem.

For more than 20 years, the Institution's International Environmental Science Program has been monitoring both biological and physical processes, and it currently possesses an incomparable set of data for both tropical and temperate sites. The proposed enhancements to this program, in conjunction with proposed research initiatives at both the Smithsonian Tropical Research Institute (STRI) and the Smithsonian Environmental Research Center (SERC), will exploit and build upon the unique data already in the possession of the Institution. The permanent nature of the Smithsonian's study preserves at STRI and SERC fit the criteria for global monitoring centers cited in the National Academy of Sciences Report and endorsed by the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET) Committee on Earth Sciences.

In addition to studies dealing with biological and physical processes, the National Museum of Natural History (NMNH) will expand ongoing research on biological diversity in tropical Latin America to additional rain forest sites. NMNH will emphasize multi-disciplinary study of organisms and their reaction to broad processes of global change. Recent studies have conclusively determined that, without an integrated and multi-disciplinary approach to this issue, scientists will be unable to find adequate solutions for arresting environmental degradation.

The information that the Institution will generate as the result of proposed initiatives in global change research will be broadly available to policy makers and throughout the scientific community. These scientific findings are also certain to form the basis for exhibitions in the National Museum of Natural History, the National Air and Space Museum, and other venues for public programming. The Institution's proven ability in sustaining long-term research at permanent sites is a crucial function that distinguishes the Smithsonian from Federal organizations and most universities involved in such research.

For FY 1991, the Institution is requesting 28 workyears and \$2.1 million to undertake various research inquiries to assist in understanding the phenomenon of global environmental change.

Cultural Pluralism - The demographics of the United States are changing. What has been the dominant cultural group will no longer be the majority in our work force and our schools. The pluralism of our country is evident. This change and the exciting self-pride that minority groups are exerting calls for new responses on the part of the Smithsonian to be more sensitive in its public programs, hiring practices, training opportunities, exhibition presentations, and collections acquisition. As a national institution, the Smithsonian must assume a viewpoint that is deliberately inclusive in all respects.

The Smithsonian has much work to do if it is to continue to advance this "national imperative." The Institution must create exhibitions and programs that rethink the relationship between the indigenous peoples and the New World conquerors. The Columbus Quincentenary Program provides this opportunity. It will celebrate the accomplishments of minority people and make known to others the richness of their history. The Smithsonian must assist in training minority people who wish to enter the Smithsonian's professional work force and increase the number of trained minority people throughout the museum profession at large. The Institution must be sensitive to the wishes of the native-American communities for their human remains. It must plan for the new National Museum of the American Indian (NMAI) and make it a reality, particularly through preparing native-American staff to assume new professional positions of leadership within the new museum. In addition to these efforts, the Smithsonian must make sure that its programs and exhibitions welcome all peoples.

This is an exciting time. The Smithsonian is working on many fronts to reflect with accuracy and enthusiasm the new and forgotten realities of neighbors, immigrants, and indigenous peoples. For FY 1991, the Institution is requesting 83 workyears and \$6.3 million to undertake various initiatives that will broaden the cultural diversity of its public programs.

FACILITIES:

Construction - The Smithsonian's request for the Construction program for FY 1991 totals \$61.5 million. This amount is \$48.3 million over the OMB planning target of \$13.1 million. Consistent with its emphasis on ensuring an adequate infrastructure for current programs and services, the Institution is requesting a funding level that accurately represents its real short-range needs. Within the request are \$5.54 million for minor construction, alterations, and modifications to existing buildings to meet the changing requirements of current programs and \$1.5 million to conduct detailed planning for future construction projects.

The remaining \$54.45 million is for planning, design, or construction for a number of pressing projects on the immediate horizon. Within this amount is \$38.25 million for the General Post Office Building, \$8.2 million related to the National Museum of the American Indian, \$6 million for the National Air and Space Museum Extension, \$1.5 million for the Natural History Building East Court "in-fill" project, and \$500,000 for an art and history collections center. This list of projects represents the Institution's most pressing new space requirements taken from a ten-year construction plan designed to address systematically a variety of space and program deficiencies.

Construction and Improvements, National Zoological Park - The request for the construction program at the National Zoological Park for FY 1991 is \$19.1 million. This figure is \$12.4 million above the planning target from OMB. The request includes \$2.8 million to fund the highest priority repair and restoration projects at the Rock Creek Park site and Front Royal, Virginia. The remaining \$16.3 million includes \$12 million to continue the implementation of the Rock Creek Master Plan and \$4.3 million for the Front Royal Development Plan.

Repair and Restoration of Buildings - The Smithsonian is again requesting \$35 million for the Repair and Restoration account. The Institution must continue to eliminate the substantial backlog of deferred maintenance and repairs in its various facilities and protect the integrity of its physical infrastructure. Within this amount is \$14 million for the Major Capital Renewal program and \$21 million for

Repair, Restoration, and Code Compliance projects. With this level of annual funding, the backlog of repair projects will take from seven to ten years to eliminate.

NONAPPROPRIATED SOURCES OF FUNDING

In addition to the support provided by Federal appropriations, the Institution receives nonappropriated funds to expand and enrich its programs. The Institution presents nonappropriated fund activities (Trust funds) along with the Federal budget request to provide an overview of all uses of funds for each Smithsonian bureau. The estimates for Trust funds are subject to the uncertainty of donations, grants and contracts, fluctuations in visitor attendance, and the volatility of the economy, the last of which directly affects restaurant, mail order and shop revenues, Associates' memberships, and other auxiliary activities. The Institution's gross operating revenue, less the expenses of the auxiliary activities, represents the net operating revenue available for programmatic and other worthwhile purposes.

The FY 1990 Trust budget comprises approximately 28 percent of net operating revenues. These revenues include grants and contracts received from government agencies. The Smithsonian expects grants and contracts will total nearly \$30 million in FY 1990. The Institution anticipates gross Trust fund revenues, excluding government grants and contracts, will be approximately \$248 million in FY 1990. However, the Institution projects net income will be in the \$61 million to \$62 million range (which includes \$22 million for restricted purposes).

The Trust funds include unrestricted funds, restricted funds, and government grants and contracts, and the Institution applies them in the following manner:

Unrestricted Funds

General - The sources of general unrestricted funds are investment income; unrestricted endowment income; net proceeds from the museum shops, mail order division and food service concessions; sales of Smithsonian books, records, and other products based on designs and objects in the collections; the Resident Associate and National Associate Programs (including the Smithsonian and Air and Space magazines); and overhead recovery on grants and contracts the Smithsonian receives and from internal administrative fees charged to other Trust-funded activities. Overhead recovery is the principal source of Trust support for central management and administrative service units of the Institution, such as legal counsel, accounting, personnel, procurement, and budget. General funds also support various activities, such as the Visitor Information and Associates' Reception Center, the Cooper-Hewitt Museum, Smithsonian Tropical Research Institute, Office of Telecommunications, Office of Folklife Programs, and a variety of Institutional and bureau-based programs. The Board of Regents approves these allotments.

Special Purpose - These funds arise from revenue-producing activities operated by various bureaus and offices. The two largest of these activities are the Theater and Spacearium operations of the National Air and Space Museum. Special Purpose funds also include: miscellaneous revenues from the sale of posters, exhibit brochures, and publications; tuition reimbursement from universities; the museums' share of sales in the restaurant and museum shops; membership and admission fees; exhibit rental income; and investment income from current fund balances.

In FY 1979, the Board of Regents approved the annual transfer of General funds to Special Purpose funds for certain programs previously financed through Federal appropriations. These include the Institution's various fellowship programs (FY 1990 allotment of \$3 million). The Institution also uses Special Purpose funds to make awards under its Collections Acquisition, Scholarly Studies, and Educational Outreach Program. Of the total \$4.98 million approved for the Program in FY 1990, \$1.88 million is available to purchase exceptional objects important to the collections.

The Program has designated \$2.55 million for innovative scholarly research projects which by definition or because of their schedule do not fit within the Federal budget process. These include multi-disciplinary research projects conducted within and between bureaus and projects that have received external funds requiring matching Trust support. The Institution has allocated the remaining \$550,000 of the \$4.98 million available for this Program to conduct a wide range of educational outreach programs of benefit to the public, with special focus on diverse cultural audiences.

In FY 1985, the Board of Regents approved an annual Trust fund allocation for the Special Exhibition Fund. The Institution has generally met the cost of exhibition programs with Federal funds, which will continue to provide the predominant financing for the Institution's overall exhibition effort. Individuals, foundations, and corporations have provided supplemental donations. Administered in the same way as the Collections Acquisition, Scholarly Studies, and Educational Outreach Program, the Special Exhibition Fund, with \$3.52 million in FY 1990, will provide funds for temporary or permanent exhibitions proposed by Smithsonian bureaus that, regardless of scale, are outstanding in terms of their educational value to the public. This Fund will give special consideration to exhibitions that approach content in imaginative ways; that allow bureaus to explore new or expand current interpretive or exhibition techniques; that are worthy but, by their nature, unlikely to attract private funds; and that are likely to reach previously under-served audiences.

Restricted Funds

Restricted Trust funds include gifts, grants, and endowments from individuals, foundations, organizations, and corporations that specify the use of the donation or bequest. Generally, these funds provide support for a particular exhibit or research project. The Freer endowment is the largest restricted endowment in the Institution. Under the terms of the original gift and bequest, this fund is strictly limited to uses benefiting the Freer Gallery of Art.

Government Grants and Contracts

Various government agencies and departments provide grants and contracts for special projects which only the Smithsonian can conduct because of its expertise in a particular area of science, history, art, or education and because of its ability to respond quickly to certain needs.

SPECIAL EMPLOYMENT INITIATIVES AND ETHNIC CELEBRATIONS

Status of Special Employment Initiatives

The "Special Employment Initiatives" programs conceived and temporarily implemented in FY 1988 with permanent funding anticipated in the Smithsonian's FY 1990 appropriation are taking shape and beginning to have an effect on many parts of the Institution. Of the twenty-one professional positions requested, all but three have been filled. These three are in the recruitment process. The ten Step Up '90 upward mobility positions will be competitively filled early in FY 1990. Fifty-eight proposals for positions were submitted for this program from twenty-one bureaus and offices. A review group will determine which proposals will be advertised for internal recruitment.

Ethnic Celebrations

As an adjunct to employment initiatives to increase the cultural diversity of professional staff, the Smithsonian also is redefining and expanding its outreach efforts in the area of annual events celebrating the achievements and contributions of women and the major ethnic minority groups. Since 1979, the Office of Equal Opportunity has organized pan-Institutional committees to plan and present special programs aimed primarily at staff participation. With increased emphasis on the need for community and national offerings and involvement, however, it is appropriate to place responsibility for this important effort in the Office of Wider Audience Development, under the aegis of the Assistant Secretary for Public Service. That office will have responsibility to plan and organize the Institution's efforts, drawing upon the creative thoughts of staff throughout the Smithsonian. To place this program on a sounder financial basis for planning and implementation purposes, an amount of \$50,000 is sought in the Fiscal Year 1991 budget request.

FY 1991 UNCONTROLLABLE INCREASES

The Smithsonian Institution seeks funds to pay costs that are beyond its control. These costs result from established practices in regulating wages, higher rental costs, and the effects of inflation and other factors. The Institution requests \$12,704,000 for the following uncontrollable costs:

Salary and Related Costs

--Legislated Pay Raises	\$ 5,500,000
--Within-grade Step Increases	2,050,000
--One Additional Workday	650,000
--Workers' Compensation	249,000
--Personnel Payroll System	138,000
--Payroll Base Deficiencies	<u>344,000</u>
Total, Salary and Related Costs	\$ 8,931,000
Utilities, Communications, and Postage	\$ 1,099,000
Rental Space	\$ 674,000
Inflation	<u>\$ 2,000,000</u>
Grand Total, Uncontrollable Increases	<u>\$ 12,704,000</u>

SALARY AND RELATED COSTS - The Institution requests a net amount of \$8,931,000 for the projected higher salary and benefits costs in FY 1991 for FY 1990 staff. The Smithsonian has calculated costs required to fully fund the FY 1990 general payraise in FY 1991 (\$5,500,000) and anticipated within-grade increases (\$2,050,000)--based on workyears authorized by the Office of Management and Budget (OMB)--for each of the bureaus and offices. In FY 1991 the Institution also requires funds to cover costs attributable to one additional paid day (\$650,000), increased workers' compensation costs (\$249,000), increased operating costs for the Personnel Payroll System (\$138,000), and payroll base deficiencies within several Smithsonian offices (\$344,000).

Legislated Pay Raise - The Smithsonian has included an amount of \$5.5 million in its FY 1991 estimates to cover the full-year effects of the anticipated 3.6 percent January 1990 pay raise. This action is in accordance with OMB Circular A-11 and OMB Memorandum M-89-19. The Institution estimates that the partial-year cost related to this pay raise in FY 1990 will be \$4.125 million.

Within-grade Step Increases - The Smithsonian seeks \$2,050,000 in FY 1991 for within-grade step increases. For General Schedule employees, these increases are required by Section 5335 of Title 5, United States Code. Wage employees are covered by law and prevailing rates. Increases include the part-year costs of new actions scheduled to occur in the budget year as well as the cost of annualizing FY 1990 step increases.

Additional Workday - Currently, base funding is available for employee compensation for a 260-day workyear based on a 2,087 hourly rate calculation. FY 1991, however, contains 261 workdays, requiring additional funding of \$650,000 to cover employee salary and benefit costs.

Workers' Compensation - The Smithsonian requires a total of \$1,130,000 to meet the provisions of Section 8147(b) of Title 5, United States Code, as amended on April 21, 1976, by Public Law 94-273. This law provides for payments to be made to employees for injuries and to their families in cases where work accidents result in employee death. These payments are determined and made by the U. S. Department of Labor's Employment Standards Administration, which subsequently bills agencies for costs incurred for their employees. The Institution continues to pursue its Accident Safety Program administered by the Office of Environmental Management and Safety. This Program includes employee training in safe working environments and supports a staff whose duties include identifying and eliminating potential accident hazards. The FY 1991 bill for the Institution's Federal portion, \$1,130,000, covers the actual expenses incurred for the period July 1, 1988, through June 30, 1989. With an amount of \$881,000 in its base for workers' compensation, the Institution requires an additional \$249,000.

Personnel Payroll System - The Institution uses the computer services of the U. S. Department of Agriculture's National Finance Center (NFC) to support personnel management and payroll production. With base Federal funds of \$522,000, the Smithsonian requires an increase of \$138,000 for the Federal share of processing the payroll and personnel data and related communication services for current staff and anticipated new positions.

Payroll Base Deficiencies - The Institution requests \$344,000 to address payroll related base deficiencies in several of its smaller offices--most of which are in the Public Service area. These offices have experienced a gradual erosion of base funding as a result of staff promotions, pay increases, and the occasional need to fill vacancies at higher grades to attract the best available candidates. Offices with small operating budgets have little flexibility to reprogram resources and, for obvious reasons, are particularly vulnerable to this type of base erosion. The requested funding will restore the respective budgets to a current services level.

UTILITIES, COMMUNICATIONS AND POSTAGE - An FY 1990 base of \$20,103,000 is available to fund the costs of electricity, steam, gas, fuel oil, water, communications, and postage for nearly all Institution facilities. The Smithsonian needs an increase of \$1,099,000 in FY 1991 to cover anticipated costs.

The Smithsonian's projections of future utilities costs consider a variety of factors. These include:

- comparative data on actual energy consumption in previous years for each facility;
- adjustments for normal weather conditions for this geographic region based on information provided by the National Weather Service;
- actual and projected rates charged by utility companies;
- actual and projected reimbursements for utility costs from concessions, museum shops, and the Friends of the National Zoo;
- modifications to work and public spaces within facilities;
- continued energy conservation efforts in all Smithsonian buildings;

- improvements installed to heating, ventilating, and air conditioning systems and components throughout the physical plant;
- the design of new facilities;
- projected increases in consumption caused by expanded use of computers and other equipment throughout the Institution.

The following table shows the costs and base funds available to cover the components of the Utilities account from FY 1989 to FY 1991.

ANALYSIS OF UTILITIES AND COMMUNICATIONS COSTS
FY 1989 - FY 1991

	<u>FY 1989</u> <u>Estimate</u>	<u>FY 1990</u> <u>Estimate</u>	<u>FY 1991</u> <u>Estimate</u>
<u>ELECTRICITY</u>			
<u>Use</u> - Millions of KWH	114.8	116.1	117.5
<u>Unit Cost</u> - Average per KWH	.061	.062	.063
<u>Cost</u> - \$000's	\$7,000	\$7,200	\$7,400
FY 1991 Estimated Cost			\$7,400
FY 1990 Base			<u>\$7,217/1</u>
Base Shortage, Electricity			\$ 183
<u>STEAM</u>			
<u>Use</u> - Millions of Pounds	211.9	212.9	212.9
<u>Unit Cost</u> - Avg. per 1,000 lbs	15.50	15.50	15.50
<u>Cost</u> - \$000's	\$3,284	3,300	3,300
FY 1991 Estimated Cost			\$3,300
FY 1990 Base			<u>\$3,239</u>
Base Shortage, Steam			\$ 61
<u>GAS</u>			
<u>Use</u> - Millions of Cubic Feet	1.282	1.293	1.293
<u>Unit Cost</u> - Avg. per cubic Ft.	.6186	.6186	.6186
<u>Cost</u> - \$000's	\$ 793	\$ 800	\$ 800
FY 1991 Estimated Cost			\$ 800
FY 1990 Base			<u>\$ 800</u>
Base Shortage, Gas			\$ 0
<u>FUEL OIL/WATER</u>			
<u>Cost</u> - \$000's	\$250	\$ 250	\$ 250
FY 1991 Estimated Cost			\$ 250
FY 1990 Base			<u>\$ 150</u>
Base Shortage, Fuel Oil/Water			\$ 100

D.C. GOVT. WATER/SEWER

<u>Cost</u> - \$000's	\$ 0	\$3,675	\$3,800
FY 1991 Estimated Cost			\$3,800
FY 1990 Base			<u>\$3,675</u>
Base Shortage, D.C. Water/Sewer			\$ 125

COMMUNICATIONS

<u>Cost</u> - \$000's	\$3,700	\$3,900	\$4,152
FY 1991 Estimated Cost			\$4,152
FY 1990 Base			<u>\$3,900</u>
Base Shortage, Communications			\$ 252

POSTAGE

<u>Cost</u> - \$000's	\$2,000	\$2050	\$2,100
FY 1991 Estimated Cost			\$2,100
FY 1990 Base			<u>\$1,722</u>
Base Shortage, Postage			\$ 378

TOTALS

FY 1991 Estimated Cost	\$21,750
FY 1990 Base	<u>\$20,703/1</u>
FY 1991 Requested Increase	\$ 1,099

1/ Reflects FY 1990 Federal base plus anticipated reimbursements in FY 1991 of \$600,000.

Electricity - The major component of the Utilities account is electricity. The FY 1991 estimate reflects an increase in overall consumption associated with full occupancy of pods at the Museum Support Center (MSC), new facilities at the Smithsonian Astrophysical Observatory (SAO) expected to be occupied and in full operation, and general increases associated with major automation efforts under way in all Smithsonian facilities. The consumption increase also reflects higher than previously planned use of electricity at the new restaurant in the National Air and Space Museum (NASM), although the increased cost is offset by a reimbursement received from the operator of the restaurant. The FY 1991 rate estimate includes a small average rate increase to cover the 4.32 percent rate increase approved by the Maryland Public Service Commission in June 1988 for electrical service furnished customers. As a result of this rate increase and the anticipated consumption increase, an additional \$183,000 is necessary to cover estimated electricity costs in FY 1991.

Steam - The FY 1991 estimate reflects an estimated increase in steam consumption over current levels associated with a return to more normal winter weather patterns. As a result of this consumption increase, an additional \$61,000 is necessary to cover estimated steam costs for FY 1991.

Gas - The FY 1991 estimate reflects a slight consumption increase over the current level associated with the full occupancy of the pods at the MSC. However, base funds are adequate in FY 1991 to cover the costs associated with this consumption increase.

Fuel Oil/Water - The FY 1991 estimate reflects a 12 percent rate increase in the cost of water and sewer provided by the Washington Suburban Sanitary Commission that became effective on July 1, 1988. In addition, water and sewer consumption at MSC has increased significantly as this facility continues to move toward full operation. As a result of both the consumption and rate increases, an additional \$100,000 is necessary to cover estimated fuel oil and water costs for FY 1991.

D.C. Government, Water/Sewer - Consumption and cost estimates provided by the District of Columbia Government indicate that an additional \$125,000 is necessary to cover estimated D.C. Government water/sewer costs for FY 1991.

Communications - The Institution continues its efforts to limit communications costs through increased monitoring and review of long distance calls, limiting access to long distance lines to reduce the potential for abuse, and increased monitoring of telephone charges to reduce billing errors. Despite these measures, telephone costs continue to rise. Additional expenses associated with the use of FTS 2000 are anticipated due to higher rates for off-net usage of this new system. A Panama to Washington communications data link, expected to be fully operational by FY 1991, will also generate additional costs. Finally, additional costs for installations and monthly service associated with new facilities at the Smithsonian Tropical Research Institute (STRI) and SAO are also predicted. An additional \$252,000 is necessary to cover estimated communications costs in FY 1991.

Postage - Ongoing efforts to control postage costs have resulted in reducing the cost of postage services to the Institution. Postage costs for domestic mailings remain rather constant as a result of eliminating first-class package service and placing tighter controls on the use of express mail service. Management has instituted an internal review of mailing practices at locations off the Mall to ensure that established policies and objectives are consistently followed. However, despite these steps and controls, postage costs continue to increase, primarily as a result of increased volume associated with program activities and responses to public information requests. The Smithsonian request for FY 1990 was reduced by \$328,000 as directed by OMB due to proposed legislation that would create a separate class for government mail. To date, this legislation has not been introduced. The additional \$378,000 requested for FY 1991 restores this reduction and provides additional funds to cover the costs of an anticipated increase in mailing volume.

Energy Conservation - The Institution continues to monitor and limit all forms of energy consumption. An automated energy management system reduces peak energy demand by selectively shutting down equipment when necessary. This system, when fully installed, will monitor equipment in all buildings for fluctuations or malfunctions and alert staff to inspect for problems. Ongoing efforts also include:

- continuing the phased program of performing comprehensive building energy audits;
- renovating heating, ventilating, air conditioning, plumbing, and electrical systems;
- reducing lighting levels in work and nonpublic areas;
- installing more efficient lighting fixtures;

- operating heating and air conditioning systems at the minimum level necessary to prevent damage to the collections;
- curtailing electrical consumption during nonpublic hours;
- increasing attention to energy conservation when determining space use, modifying space, and designing new facilities.

Through the use of the Facilities Management computer system, the Smithsonian will eventually gain closer control over building lighting systems. This system conserves electricity by turning lights on and off as use fluctuates. Automated lighting controls are now in place at the Natural History Building, the Air and Space Building, the Quadrangle Complex, and the American History Building. The Smithsonian plans to install such a system for the American Art and Portrait Gallery Building in FY 1990/FY 1991 and in later years in other major buildings.

RENTAL SPACE - For FY 1991, the central rental account, managed by the Office of Plant Services, requires \$184,000 for uncontrollable expenses. This account provides for the Federal portion of the rental expenses for program and administrative activities located at L'Enfant Plaza, the Smithsonian Institution Service Center at 1111 North Capitol Street, the research bureaus of the Archives of American Art in New York City and Boston, Massachusetts, and storage space at the Fullerton Industrial Park in Springfield, Virginia. The amounts below reflect projected costs for rental space at these sites:

FEDERAL RENTAL PROGRAM ADMINISTERED BY THE OFFICE OF PLANT SERVICES
FY 1989 - FY 1991

(\$000's)

	<u>FY 1989</u> <u>Estimated Cost</u>		<u>FY 1990</u> <u>Estimated Cost</u>		<u>FY 1991</u> <u>Estimated Cost</u>	
	<u>Federal</u>	<u>Trust</u>	<u>Federal</u>	<u>Trust</u>	<u>Federal</u>	<u>Trust</u>
L'Enfant Plaza	\$ 901	\$951	\$1,419	\$1,164	\$1,500	\$1,201
North Capitol Street	950	139	1,045	125	1,137	138
Archives of American Art:						
- New York	155	--	160	--	160	--
- Boston	13	--	15	--	15	--
Fullerton	<u>51</u>	<u>--</u>	<u>298</u>	<u>--</u>	<u>309</u>	<u>--</u>
Total Costs	\$2,070	\$1,090	\$2,937	\$1,289	\$3,121	\$1,339
Base	<u>\$2,034</u>	<u>\$1,090</u>	<u>\$2,937</u>	<u>\$1,289</u>	<u>\$2,937</u>	<u>\$1,339</u>
Surplus/(Deficit)	\$ (36)	\$ --	\$ --	\$ --	\$ (184)	\$ --

The FY 1991 estimate for Federal rental costs for L'Enfant Plaza reflects annual cost increases specified in the lease agreement and continues to take into account the offsetting Trust fund contribution for shared administrative activities and office space occupied by the specific auxiliary activities on the Mall.

The projected rental expense for space at 1111 North Capitol Street includes the annual cost increase specified in the current lease, with the allocation policy on administrative and programmatic space also governing the Federal/Trust apportionment of costs for this location.

The projected rental expense for the Archives of American Art represents funding requirements for the spaces occupied in New York and Boston.

Finally, the projected rental expense for Fullerton reflects the continuing cost of storage space approved for the Smithsonian Institution Archives in FY 1989 and the National Museum of American History anticipated in the FY 1990 appropriation.

For FY 1991, the projected Federal share of the central rental account is \$3,121,000. The Institution's base is \$2,937,000 in FY 1990. Therefore, the Smithsonian requires an additional amount of \$184,000 to defray space rental costs at these locations in FY 1991.

Additional Rental Space Requirement - There is increasing demand on the Institution to provide space on the Mall for new or expanding programmatic activities. In particular, increased pressure for space in the Castle (much of which is allocated to the Visitor Information Center and the Woodrow Wilson Center) and in the Arts and Industries Building requires that thoughtful surveys be conducted to determine which organizational units should remain in those buildings and which could be moved to nearby commercial space. In order to accommodate existing programmatic space needs and to develop public education programs in the Arts and Industries Building, the Institution requests funding for approximately 17,000 square feet of rental space.

The Institution bases the requested increase on the anticipated move of administrative units and consequent cost-sharing policy. The 70 percent Federal share (\$350,000) is estimated on rental forecasts of \$31.00 per square foot for space at L'Enfant Plaza. In addition, the Institution requests a one-time increase of \$140,000 to partially cover the costs of modifying the new space to meet the needs of transferred units. The Smithsonian will cover the remaining 30 percent of the rental costs (\$150,000) and modification costs (\$60,000) from nonappropriated Trust funds.

INFLATION - Inflation continues to reduce the Institution's purchasing power for equipment, supplies and other services. Anticipated economic growth and high employment levels will lead to increased costs for supplies and services the Institution requires on a regular basis. Increased service charges for supplies purchased through GSA and their contract vendors compound the external inflationary erosion of the Institution's established base. The following are examples of supplies and services affected by recent trends in inflation.

Exhibitions - Inflationary increases for construction materials, equipment and supplies place a strain on the base resources needed to maintain an active exhibition program. The table below illustrates cost increases for items used extensively in exhibit preparation.

Exhibition Materials

<u>Item</u>	<u>FY 1988 Cost</u>	<u>FY 1989 Cost</u>	<u>Percentage Increase</u>
Fluorescent Lamp	\$2.99	\$3.71	24
Flat Lacquer per gal (white)	17.20	21.90	27
Plexiglass:			
4'x8'1/8" UF3 - sheet	140.29	163.50	17
4'x8'1/4" UF3 - sheet	199.05	233.60	17
Tape	1.45	2.91	101
Plywood:			
3/4" birch - sheet	34.08	37.12	9
1/2" birch - sheet	27.84	29.84	7
A/V equipment:			
video tape deck - each	1,200.00	1,380.00	15
video tape stock - case	148.00	194.52	31

Collections Management - Comprehensive collections management programs necessary for the preservation of the objects at the Institution are not immune from inflationary effects. A list of examples illustrating the effects of inflation on items necessary for preservation follows.

Collections Management Equipment and Supplies

<u>Item</u>	<u>FY 1988 Cost</u>	<u>FY 1989 Cost</u>	<u>Percentage Increase</u>
Polyethylene bottles:			
5 ml 24/case	\$23.37	\$34.20	46
15 ml	27.08	35.63	32
Wheaton vile files:			
12 mm (d) 24/case	21.20	23.80	12
Weighing bottles:			
40 x 50 mm (d) 48/case	142.00	156.28	10
Non-hinged boxes to house collections/each	8.86	11.50	30
Negative handling gloves	10.45	11.86	13
Kodak paper - poly III E 40"/100	151.37	188.94	25
Kodak film - LPF 11"x14"	90.42	101.65	12

Research - The Smithsonian's strength as a research institution is bolstered by the quality of its research support operations. The Institution's researchers depend on research tools, the latest scientific equipment or books and research journals. Without compensation for lost buying power, the Smithsonian will inevitably lose credibility as having a research facility adequate for the requirements of its research staff. The table below illustrates examples of price increases for research related items which museums and the Zoological Park purchase.

Research Equipment and Supplies

<u>Item</u>	<u>FY 1988 Cost</u>	<u>FY 1989 Cost</u>	<u>Percentage Increase</u>
Mailers, Microscope slide	\$64.80	\$71.28	10
Slides, Microscope (gen, cs)	220.00	239.31	9
Pins, mounting, Insect	21.00	25.27	20
Alcohol (barrel)	132.00	174.00	32
Filter paper 15 cm/pkg	6.40	7.20	13
Blow pipe syringe, 3ml	4.80	6.00	25
2 inch Kling bandage case	25.40	31.26	23
Ivermectin (package of 10)	82.90	88.93	7
H-P Function Gen. 3312A	1,450.00	1,595.00	10
Polaroid film Type 667	9.80	10.70	9
Maintenance Contracts:			
Carl Zeiss, Inc. (TEM)	4,620.00	4,950.00	7
Tracor Northern (SEM)	5,792.00	7,236.00	25
JOEL USA (SEM)	7,300.00	10,380.00	42

Facilities Management and Administration - All programs at the Institution are affected by the services provided by Facilities Management and Administrative offices. These offices are responsible for the maintenance and protection of the Institution's facilities, visitors, and staff. Maintenance of the facilities requires regular purchase of custodial supplies and equipment in addition to services, all of which are subject to price increase. Information resource management is most efficient with regular upgrades and maintenance of hardware and software as well as staff training on new systems. The anticipated increase in supplies and services related to information resource management are expected to increase at 9 percent, a rate that has remained constant for the last three years. Examples of facility management supplies and services which are subject to price increase follow.

Administrative and Buildings Maintenance Supplies and Contracts

<u>Item</u>	<u>FY 1988 Cost</u>	<u>FY 1989 Cost</u>	<u>Percentage Increase</u>
Floor finish/gal	\$10.10	\$10.60	5
Stripper/gal	6.30	6.95	10
Plastic bags, 32 gal	19.10	36.40	91
Copy paper/carton	19.02	27.25	43
Envelopes/box:			
white, franked, 4 1/8" x 9 1/2"	4.70	5.43	16
IBM PS/2 60	2,858.00	3,582.00	25
Computer ribbons PM016 (ea)	9.24	10.00	8
Post-it pad (dz)	3.61	4.49	24
Paper towel/case	10.10	14.62	45
Insecticide, aerosol	54.20	56.91	5
Pest control contract, NMAH	1,470.00	1,543.00	5
Guard laundry/dry cleaning	6,294.00	6,928.00	10
Guard shirts	27,207.00	30,000.00	10
Contract nurse/hr	16.32	18.02	10
Copiers lease/annum	16,610.00	17,820.00	7
Xerox maintenance	498.00	920.00	85

For FY 1991, the Institution seeks \$2 million to help offset the base erosion due to inflation. The amount represents 3.3 percent of the Institution's Federal budget for FY 1990, excluding personnel, utilities, rent and Museum Support Center equipment and move costs.

The impact of inflation is equivalent to a significant reduction each year to the base resources of all Smithsonian organizational units. As a consequence, inflation affects scientific, research, educational and public programs, and the care and conservation of the Institution's collections.

RESEARCH

OFFICE OF THE ASSISTANT SECRETARY FOR RESEARCH

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	40	1,669	6	374	-	2,138	-	400	-	98
FY 1990 Estimate	40	1,722	6	662	-	2,254	-	281	-	79
FY 1991 Estimate	44	1,955	6	662	-	2,252	-	281	-	24

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of the Assistant Secretary for Research provides guidance, planning, and overall policy direction to the Smithsonian Institution's research efforts and research support activities. Also included in this line-item are the Joseph Henry Papers, the Office of American Studies, and the Office of Fellowships and Grants.

The Joseph Henry Papers researches and publishes the manuscripts of Joseph Henry, first Secretary of the Smithsonian and a leading 19th-century American physicist. The Office of American Studies conducts a graduate program in the field of American material culture, incorporating course work at the Smithsonian. The Office of Fellowships and Grants provides central management and administrative responsibility for the Institution's programs of research grants, fellowships, and other scholarly appointments. (The latter two offices are new components in this line-item. For FY 1990 and prior years, budget information for these offices appeared in the Special Programs section.)

For FY 1991, the Office of the Assistant Secretary for Research requests an increase of 1 workyear and \$90,000 to provide a diving safety officer and support for the Diving Program. The Joseph Henry Papers requests an increase of 2 workyears and \$85,000 to provide a secretary (1 workyear and \$32,000), a staff research assistant (1 workyear and \$35,000) and to upgrade document index software (\$18,000). The Office of Fellowships and Grants requests 1 workyear and \$58,000 for a Fellowship/Internship Coordinator (1 workyear and \$46,000) and funds for printing (\$12,000).

PROGRAM - I. Office of the Assistant Secretary for Research: With base funding of 24 workyears and \$1,014,000, the Office of the Assistant Secretary for Research (OASR), in concert with the Secretary and other appropriate management staff, supervises the research activities of the Institution. OASR serves as the major Institutional liaison for research centers in the United States and abroad. The Office is responsible for enhancing the Institution's scholarly environment and productivity by initiating cyclical outside evaluations of scholarly activities; fostering regular reviews of individual scholars' performance; providing increased research opportunities through internal competitive funds; creating and coordinating

central programs that support individual and group research efforts; broadening the base of funding for research through both Federal and private funds; assessing programmatic effectiveness and making recommendations for curtailment of selected activities; deepening and selectively expanding the Institution's activities in areas of high Institutional priority; and establishing joint programs, appointments, and cooperative efforts with other scholarly institutions, including the Nation's universities. This Office is also responsible for tracking external research trends and ensuring that they are appropriately coordinated with current Smithsonian activities. The Office oversees and coordinates scientific diving activities which support collection and study of underwater subjects and environments by a variety of Smithsonian research bureaus.

A fundamental responsibility of this Office is to develop guidelines to ensure the superior quality of research conducted at the Institution. The Office provides guidance on shifts of emphasis, suggestions for new areas of research, access to state-of-the-art facilities and equipment, and advice on selecting and promoting scholarly staff. In addition, the Office strives to improve the dissemination of Smithsonian research findings to the general public and to specialized audiences.

Carbon Dating Services - Contract services for dating, cleaning, and conserving objects are important to Smithsonian research in such areas as history, art, and science. In FY 1987, the Institution established a competitive fund to support carbon dating. This fund allows for analyses that produce valuable data for a wide range of research projects.

II. Joseph Henry Papers: With base funding of 5 workyears and \$228,000, the Joseph Henry Papers collects, transcribes, researches, edits, annotates, and publishes the manuscripts of Joseph Henry, a pioneer American physicist and the first Secretary of the Smithsonian Institution. Publication objectives are a 15-volume letterpress series, an indexed 90,000-item microform edition, and special publications for a more general audience. The project is a source of unpublished and little-known letters and papers, collected from 30 foreign countries and 328 depositories in the United States. The documents and commentary provided by the editors give insight into the history of science, the development of Federal policy toward the sciences, the institutional and social structure of the scientific community in the 19th century, and the history of the Smithsonian Institution.

The Henry Papers staff expects the publication of the sixth volume of the series in FY 1990. This volume, covering the years 1844-46, details Henry's work at the College of New Jersey (now Princeton University). In laboratory notebooks, Henry describes his extensive experimentation in electricity and magnetism. Letters, notes, and newspaper articles trace the establishment of the Smithsonian Institution and Henry's election as the first Secretary. In FY 1990, the Henry Papers staff will complete the preliminary selection of 300 manuscripts from the 3,720 available for publication in volume 7. This volume will focus on Henry's efforts to establish the Smithsonian Institution as a center for the support of original research. Staff efforts to transcribe, research, and annotate these manuscripts will continue through FY 1991.

In addition to its publication program, the Henry Papers project is a centralized resource for Henry correspondence that includes an automated 60,000-item document index and the Alexander Graham Bell-Joseph Henry Library. Both are essential for research in the history of science and the cultural history of the United States. Students, interns, scholars, genealogists, and the general public use this material to

study such subjects as the history of acoustics, electricity, magnetism, meteorology, museums, and photography.

III. The Office of American Studies: With base funding of 2 workyears and \$111,000, the Office of American Studies (OAS) sponsors a graduate program in American material culture in cooperation with various universities located in the Washington, D.C., area and in other cities. The director of the program and cooperating scholars teach three or four seminars a year to graduate students in American studies or American history departments of affiliated universities for academic credit. Through the program, both scholars and students pursue American studies using the unique resources of experts, objects, manuscripts, and books available in various bureaus of the Smithsonian, and disseminate the knowledge acquired during course study and research performed at the Smithsonian.

IV. The Office of Fellowships and Grants: With base funding of 9 workyears and \$369,000, the Office of Fellowships and Grants (OFG) manages centralized fellowship and internship programs, all other stipend appointments, and other programs that support research. Trust funds support most of these programs. These programs facilitate communication and collaboration between the Institution and universities, museums, and research centers. They strengthen international and culturally diverse participation in Smithsonian research and related fields. In addition, the Office publishes Smithsonian Opportunities for Research and Study, an annual publication with information about the Institution's fellowships, internships, grants, and research activities.

OFG manages a variety of programs that enable students and scholars to study at the Smithsonian. In FY 1989, OFG awarded 103 predoctoral and postdoctoral fellowships through the Institution-wide program. Thirty-three of these recipients were foreign students and scholars from 20 countries. In addition, Federal and Trust funds, allotted to the bureaus for specific programs, supported 27 fellowships. Under the Short-Term Visitor Program, 131 persons came to the Institution. Seventy of the participants represented 32 countries. The Regents Fellowship Program continues to bring eminent scholars to the Smithsonian. Two fellows began their residencies in FY 1989. The Office also administered internship stipend awards for 169 students in FY 1989.

Several programs provide scholarly support to Smithsonian professional staff. Under the competitive Scholarly Studies Program, 31 research proposals received grants. Some of these awards involved collaborative studies with scholars from other institutions. The Research Resources Program, established in FY 1988, supports projects to enhance use of the Smithsonian's documentary and archival collections. After review by an outside committee, OFG awarded ten grants. The workshop program provides funding for Smithsonian staff to organize seminars, symposia, and conferences. These activities bring together scholars from around the world to discuss a variety of subjects; 15 received support in FY 1989. Three Smithsonian staff members received the James E. Webb Fellowship. The fellowships allow recipients to further their specific administrative goals and promote excellence in the management of cultural and scientific not-for-profit organizations.

The Office also administers programs to increase minority participation in Smithsonian research. Thirty-three students joined ongoing research and museum studies in the Minority Internship Program. In addition, one student received an appointment under the Cooperative Education Program. One former appointee returned to complete her tour-of-duty. The Native-American Awards Program appointed 20 native-

American students and scholars to work on native-American resources and activities at the Institution.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Office of the Assistant Secretary requests an increase of 1 workyear and \$90,000 to provide a diving safety officer and support for the Diving Program. The Joseph Henry Papers requests an increase of 2 workyears and \$85,000 for document index software (\$18,000); a secretary (1 workyear and \$32,000); and a staff research assistant (1 workyear and \$35,000). The Office of Fellowships and Grants requests 1 workyear and \$58,000 for a Fellowship/Internship Coordinator (1 workyear and \$46,000) and printing costs (\$14,000).

I. Office of the Assistant Secretary for Research

Diving Safety Officer and Support for the Diving Program (1 workyear and \$90,000) - More than 120 scholars from the National Museum of Natural History, National Museum of American History, National Zoological Park, Smithsonian Tropical Research Institute in Panama, and the Smithsonian Environmental Research Center in Edgewater, Maryland, collect and study underwater subjects and environments. The number of scientists requiring diving skills has increased over the last five years. In addition to permanent staff members, more than 100 other scientists dive annually under the auspices of the Smithsonian in support of collaborative research activities.

To meet the required guidelines of the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA), the Smithsonian Diving Program must strengthen its oversight activity. These guidelines exempt scientific diving from OSHA standards applicable to commercial diving (29 CFR Part 1910, Federal Register, vol. 50, no. 6, pp. 1046-49) but require the appointment of a diving safety officer and establishment of a diving control board that "consists of a majority of active scientific divers and has autonomous and absolute authority over the scientific diving program's operations." An internal Smithsonian management report of May 1989 also strongly urged hiring a full-time diving safety officer and allocating additional support monies to ensure proper conduct of the program.

To comply with OSHA exemption requirements, OASR requests \$90,000 to hire a full-time diving safety officer. The officer will enforce the scientific diving policies, regulations, and procedures and ensure that Smithsonian procedures conform to nationally recognized standards. In coordination with Smithsonian's Scientific Diving Board, the officer will train and certify divers, approve diving plans and operations, inspect diving sites, develop emergency evacuation and first aid plans, and maintain diving certification records. This increase will also provide support funding for the Diving Program, including travel to the various research sites, equipment, and supplies.

The position of diving safety officer will thus ensure the safety of individuals diving and coordinate diving activities among all bureaus of the Smithsonian.

II. Joseph Henry Papers (2 workyears and \$85,000)

Document Index Software (\$18,000) - The Henry Papers offers scholars, genealogists, students, and other users a customized document index of 60,000 entries on manuscripts from 30 foreign countries and 328 depositories in the United States. The index is a unique research tool for the study of 19th-century America. By updating this automated information system, the Henry Papers will contribute to the

Institution's goal of strengthening the management of its collections to aid research.

To make the index more current, accessible, and useful, the Henry Papers requests \$18,000 to purchase document index software that will upgrade and improve existing equipment and software. The additional computer capacity will allow the Henry Papers staff to enter at least 30,000 new entries to the document index. The modified software will facilitate customizing information to the specific needs of the user and enable the staff to target additional document sources. Henry Papers staff will refine and expand the range of subjects in the index.

The requested funds will enable the Henry Papers to purchase advanced versions of the software currently running the index and equipment. Remaining funds will support staff training on the new equipment.

The Henry Papers is one of the pioneers in the application of automation to the management of documents for editing projects. Its index serves as a model for other projects. Strengthening these automated capabilities enables the Henry Papers to stay at the forefront.

Secretary for the Director (1 workyear and \$32,000) - The Henry Papers requests a secretary to provide typing and ancillary office support services for the director. The addition of a secretary will allow the director to expedite programmatic research, increase educational opportunities, and develop public programs.

For FY 1991, the first priority of the director of the Henry Papers is completion of volume 7 of The Papers of Joseph Henry. This is the first book in the series to use a computerized editorial process. The director will also evaluate and restructure the educational outreach program of the Henry Papers to increase the number of opportunities for high school, undergraduate, and graduate students. At the same time, the director will begin planning for the bicentennial of the birth of Joseph Henry in 1997.

The requested secretary will provide the Director with the time to expedite programmatic research, increase educational opportunities, develop public programs, and cultivate sources of non-appropriated funds.

Staff Research Assistant/Historian (1 workyear and \$35,000) - The Henry Papers is without a research assistant, compelling the professional staff to take time from their analytical tasks to complete routine, time-consuming, mechanical tasks themselves. A staff research assistant will permit the most effective use of the professional staff's training, knowledge, and experience.

The requested staff research assistant will compare and correct the transcription of text against the original or microfilm copies to insure their accuracy. Other duties of the staff-research assistant include simple biographical identifications, routine surveys of newspapers and journals, and initial bibliographic citation verification. The assistant's research will address both published and manuscript sources for use in the annotation of the Henry documents by the professional staff and in support of public programs.

The Joseph Henry Papers staff is dedicated to the publication of Henry's manuscripts, materials that provide the public and the international scholarly community with a unique resource. The addition of a research assistant to the staff

will enable the project to serve its diverse constituency more efficiently and effectively.

III. Office of Fellowships and Grants (1 workyear and \$58,000) - The Office of Fellowships and Grants strives to maintain and enhance the Smithsonian's overall scholarly environment. To accomplish this goal, OFG distributes information regarding Smithsonian programs and creates new programs to match the growing research opportunities at the Institution.

OFG requests 1 workyear and \$46,000 for a fellowship-internship coordinator to enhance activities and provide support for visiting students and scholars. OFG staff concentrates on administrative details associated with the almost tenfold growth in awards over the last five years, leaving little time for enhancement of programs. With the requested position, OFG will develop and coordinate, more fully, new fellowship programs, joint programs with colleges and universities, graduate training programs, minority summer institutes, and other related initiatives.

OFG requests \$12,000 to help publish the Smithsonian Opportunities for Research and Study (SORS). SORS describes research facilities, resources, and staff at the Smithsonian. It is distributed throughout the United States and abroad in response to inquiries about educational opportunities at the Institution. Over the last few years, OFG has met the increased demand for SORS by moving funds from other lines of its budget. Increased demand for this publication will continue as fellowship and internship programs at the Institution expand. The requested funds are essential if OFG is to continue to provide SORS to potential applicants. .

NONAPPROPRIATED SOURCES OF FUNDING:

I. Office of the Assistant Secretary for Research: Unrestricted General and Special Purpose Funds - Annual allotments provide these funds that support the salary, benefits, and expenses of the Assistant Secretary for Research. An allotment also supports three important international foundations that operate field research stations used by Smithsonian staff members as well as by others in the world scientific community. The Seychelles Islands Foundation operates the former Royal Society station on the Island of Aldabra, in the Indian Ocean, where biological research is conducted. The Charles Darwin Foundation operates a biological research station in the Galapagos Islands. The King Mahendra Trust for Nature Conservation provides scholars with access to unique environments on the Indian subcontinent by operating a field station in the terai region (a lowland plain) of Nepal, where significant ecosystem research is in progress. Smithsonian support facilitates the continued accessibility of these areas for the research community at large. Also, the Smithsonian provides support for the exchange of scholars and scientific information between the Smithsonian and other nations, principally the People's Republic of China and Cuba. A Special Purpose Fund provides support for cooperative agreements between the Smithsonian and the Nation's universities. The Research Opportunities Fund supports unanticipated general research.

Restricted Funds - These consist of restricted endowments, gifts, and grants from individuals, foundations, and corporations that specify the use of the donation or bequest. Smithsonian units receive competitive awards from the Seidell Endowment Fund, which the OASR administers and which provides for dissemination of scientific information.

Government Grants and Contracts - The Office of Naval Research has provided contract funds for the continuation of studies in the area of manpower research and development.

II. Joseph Henry Papers: Unrestricted General and Special Purpose Funds - Funds are available from the Smithsonian's Research Opportunities Fund to support research projects.

Restricted Funds - Support in FY 1989 and FY 1990 from the National Academy of Sciences pays for incidental programmatic items not otherwise funded, including stationery, journal subscriptions, and additions to Henry Papers research collections. The Smith College Tuition Fund defrays travel and auxiliary support costs for staff, interns, and volunteers.

III. Office of American Studies: Unrestricted General and Special Purpose Funds - OAS receives tuition reimbursement from cooperating universities, principally George Washington University and the University of Maryland, whose graduate students take courses offered by the Office of American Studies. The tuition reimbursement refunds the Smithsonian Institution for the use of its facilities by the students participating in Smithsonian classes and, in addition, provides honoraria and reimbursement for the services of outside experts participating in the program.

IV. Office of Fellowships and Grants: Unrestricted General and Special Purpose Funds - These funds are primarily for the Institution-wide fellowship programs. Shorter visits by scholars and students also receive support. A program allotment supports a part of the administrative expenses of the Office of Fellowships and Grants. The Regents Fellowship Program continues to bring distinguished visiting scholars to the Institution.

In addition, special purpose funds provide for minority internships and faculty fellowships, minority students pursuing graduate degrees under the Education Fellowship Program, and the Native-American Awards Program. The Scholarly Studies Program encourages research by Smithsonian staff in the sciences, arts, and humanities.

Restricted Funds - These funds consist of restricted endowments, gifts, and grants from individuals and foundations for a particular project. They include an endowment from the Walter Rathbone Bacon Scholarship for research on fauna outside the United States, and the James E. Webb Fellowship to promote excellence in the management of cultural and scientific organizations.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	107	10,721	51	3,866	35	4,673	-	60	111	20,338
FY 1990 Estimate	111	11,172	48	4,879	35	5,692	-	162	119	26,355
FY 1991 Estimate	125	12,334	48	5,348	47	5,157	-	80	118	27,307

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - 1990 marks the 100th anniversary of the Smithsonian Astrophysical Observatory (SAO), a bureau of the Smithsonian Institution devoted to basic research in astronomy, astrophysics, and space science. For a century, SAO has pioneered studies of physical processes that determine the nature of the universe. Today, its varied scientific programs are coordinated with the Harvard College Observatory and, together, the two observatories form the Center for Astrophysics in Cambridge, Massachusetts. In addition, SAO operates the Oak Ridge Observatory in Massachusetts and the Fred Lawrence Whipple Observatory in Arizona, the latter the site of the Multiple Mirror Telescope, a joint project with the University of Arizona.

Laboratory experiments, ground-based telescopes, and instruments aboard rockets, balloons, and space satellites provide scientific data. The Observatory's computers assist in the analysis of these data, with results and scientific interpretations published in scientific journals and reports. SAO also disseminates information to a wide audience through lectures, books, and the popular media.

For FY 1991, the Institution requests no-year funding in the Major Scientific Instrumentation line-item for the nonpersonnel support to complete the design and begin construction of the submillimeter telescope array and to continue the conversion of the Multiple Mirror Telescope to a single mirror 6.5 meters in diameter instrument. In addition, the FY 1991 request for SAO reflects an increase of 12 workyears and \$782,000 for personnel costs and rent associated with the submillimeter telescope array. Since this increase is related to the Major Scientific Instrumentation request, the justification for these positions appears in the Major Scientific Instrumentation section of this budget.

For FY 1991, SAO also requests an increase of 2 workyears and \$380,000 to strengthen theoretical research (2 workyears and \$130,000); to support rent increases (\$200,000); and to support the infrared and optical telescope array program (\$50,000).

PROGRAM - Since its founding in 1890 by the Institution's third secretary, Samuel Pierpont Langley, the Smithsonian Astrophysical Observatory has been recognized as one of the world's premier centers for astrophysical research. From Langley's

turn-of-the-century studies of solar-terrestrial relationships to the establishment of the first worldwide satellite tracking network at the dawn of the space age, SAO has consistently advanced the frontiers of knowledge in fields as diverse as telescope design, x-ray astronomy, optical and radio interferometry, and cosmology. Since 1956 and its move to Cambridge, Massachusetts, SAO has worked closely with the Harvard College Observatory (HCO). Indeed, the partnership of the two observatories in the Center for Astrophysics (CfA) has fostered a broad interdisciplinary approach to research that combines observations across the entire electromagnetic spectrum with theoretical studies and laboratory experiments to provide a deeper understanding of the basic physical processes shaping the cosmos.

Research programs are organized in seven divisions, with efforts coordinated so as to complement each other: atomic and molecular physics, high-energy astrophysics, optical and infrared astronomy, planetary sciences, radio and geoastronomy, solar and stellar physics, and theoretical astrophysics. Data-gathering facilities include telescopes at the Fred Lawrence Whipple Observatory in Arizona and the Oak Ridge Observatory in Massachusetts. In addition, SAO scientists have access to data provided by instruments aboard rockets, balloons, and space satellites, as well as by laboratory experiments conducted in Cambridge. In support of this research, SAO maintains engineering and publications departments, a computation facility, an image-processing laboratory, and an extensive astronomical library. Because of its location outside of the Washington metropolitan area, SAO has its own administrative structure funded by both Federal funds and indirect charges to contracts and grants.

On behalf of the International Astronomical Union, SAO operates two global science information services: the Central Bureau for Astronomical Telegrams and the Minor Planet Center. The first is responsible for receiving, verifying, recording, and disseminating information about transient astronomical phenomena such as comets and supernovae. The second center computes orbits and provides observational information on asteroids as well as serving as the official arbiter of minor planet nomenclature.

With support from the National Aeronautics and Space Administration, SAO serves as the United States gateway for SIMBAD (Set of Identifications, Measurements and Bibliography for Astronomical Data), an international astronomical data base maintained at Strasbourg, France. Through direct computer links, SAO provides American astronomers with access to a system that contains information on almost all known astronomical objects, including all published references since 1950.

The results of SAO research are published in established scientific journals, as well as in the CfA Preprint Series, SAO Special Reports, and other technical bulletins and papers distributed to scientific and educational institutions worldwide. Lectures, books, and the popular media disseminate information intended for wider, more general audiences. An extensive program of public information and education includes monthly "Observatory Nights" in Cambridge and regularly scheduled tours of the Arizona facility. SAO and HCO also conduct an innovative program to develop secondary school curriculum materials that use examples from astronomy to teach basic principles of physics and mathematics.

Among the significant scientific accomplishments of the past year were these highlights:

-- Gamma rays: Throughout the 1970s, a relatively strong signal of high-energy gamma rays was observed coming from the direction of the center of the Milky Way.

These emissions were the result of collisions between electrons and positrons (the antimatter equivalent of electrons) that destroy each other to produce gamma rays in the cosmic version of a super-collider. The association of gamma rays with the galactic center suggested the presence of a massive black hole. However, in the early 1980s, the gamma-ray signals inexplicably disappeared and just recently--and just as mysteriously--reappeared. This year, an SAO scientist and a colleague at Bell Laboratories found that changes in an x-ray source known as GX1+4 located near the galactic center appears to mimic exactly the fluctuating gamma rays. Indeed, this suggests that GX1+4, a well-known binary system with a red giant star in orbit about a neutron star, could be the source of the mysterious on-again-off-again gamma rays. Observations by the Gamma Ray Observatory, now scheduled for launch by NASA in 1990, could pinpoint the source precisely and settle the question of where these mysterious gamma rays originate.

-- Moon rocks: Nearly two decades after the Apollo astronauts returned samples of lunar soil, an SAO scientist has identified a completely new rock type on the Moon. Tiny grains of a magnesium-rich mineral called cordierite, usually present only in very deep geological deposits, were found in a collection made by the Apollo 15 mission. The appearance of the rare mineral on the lunar surface suggests it was "excavated" by a massive meteorite impact, perhaps the same one that created the Moon's huge Imbrium Basin near where the sample was collected.

-- Silicon carbide: The close collaboration between radio astronomers and laboratory spectroscopists at SAO resulted this year in the discovery of a new molecule, silicon carbide (SiC), in the gaseous envelope around an evolved star. This free radical--a diatomic metal carbide--had long defied detection both on Earth and in space. However, the tantalizing suggestion of the molecule's distinctive lines seen in the spectra of a star by European astronomers led to its confirmation in SAO's laboratory.

-- Supernova: Although considerably faded since its discovery in February 1987, the supernova in the Large Magellanic Cloud continues to be an object of great interest to SAO scientists. One team using optical speckle interferometry to obtain unusually high resolution images of Supernova 1987A detected a slight displacement in the supernova's center of brightness with respect to the pre-explosion position of its suspected progenitor star Sanduleak -69 202. The finding suggests this star actually may have been part of a binary system and that one component survived the explosion. The presence of a second relatively bright star nearby could account for the "flattening" of the supernova's light curve, a reason why Supernova 1987A has not shown the expected steady, continuing decline in luminosity.

-- Satellite: The National Aeronautics and Space Administration has selected SAO to build and operate the Submillimeter Wave Astronomy Satellite (SWAS). This satellite will be used to study how molecular clouds in the Milky Way collapse to form stars and planets. Scheduled for launch by a Scout rocket in 1993, SWAS is part of NASA's recently revitalized Small Explorer Program, a series of small, relatively inexpensive scientific spacecraft that can be quickly developed and deployed by expendable rockets. The SAO experiment is one of only four selected from some 50 proposed in a nationwide peer-reviewed competition, and the only one to focus on phenomena outside the solar system.

A brief summary of the research conducted in each of SAO's seven divisions follows. In each section, the first paragraph describes the research in general terms, and the subsequent paragraphs describe recent accomplishments, in addition to

those highlighted above. Following these descriptions of research activities, SAO's other programs of equipment and facilities development are discussed.

Atomic and Molecular Physics - Through a combination of theoretical studies and laboratory experiments, SAO scientists in this division explore the fundamental atomic and molecular processes occurring in a wide variety of astrophysical environments--from the interiors of stars to the dusty cores of interstellar clouds to the upper reaches of the Earth's atmosphere. These complex processes include the absorption and emission of light by atoms and molecules, molecule formation and destruction, and ionization, in which a positively charged atom or molecule is created and a free electron is simultaneously released.

One of the most remarkable discoveries associated with Supernova 1987A was the detection of emission from the molecule carbon monoxide. How this molecule could have been formed--or survived--in the hostile environment of intense radiation and extreme heat associated with the stellar explosion poses some significant challenges to current theory. Division scientists have developed new models that describe conditions in the supernova's expanding shell of gas and dust and offer some specific mechanisms for molecule formation.

Growing concern over depletion of the Earth's ozone layer and the prospect of global warming have turned a long-standing divisional interest in atomic and molecular processes of the atmosphere into a subject of some immediate urgency. In collaboration with colleagues in the Optical and Infrared Division, the spectra of several stratospheric molecules were obtained by a balloon-borne infrared spectrometer flown from Palestine, Texas, in May 1989. As part of the effort to determine what processes may preserve or destroy Earth's protective shield of atmosphere, SAO scientists analyze how the abundance of molecules such as ozone, carbon dioxide, hydrogen peroxide, and hydroxyl vary with both time and altitude. This experiment represented the first infrared observations of several of these atmospheric constituents.

Since November 1988, the National Science Foundation has funded an Institute for Theoretical Atomic and Molecular Physics at SAO and Harvard University. By attracting and training graduate students of the highest quality, the Institute hopes to address a critical national shortage of theorists in this field. In support of the effort, the Institute also brings senior researchers to SAO for discussions and collaborations with the students and other staff members. In its first six months, the Institute hosted some 15 visiting scientists for stays varying from several weeks to several months.

High-Energy Astrophysics - High-energy astrophysics is concerned with some of the most exotic objects and most energetic processes in the universe. Research in this division is directed toward understanding the mechanisms that generate x-ray radiation from objects such as neutron stars, quasars, and pulsars; studying the formation, evolution, and ultimate fate of stars and galaxies; and measuring the overall distribution of matter in the universe. Because x-rays are absorbed by the Earth's atmosphere, all observations must be made from balloons, rockets, or space platforms. SAO scientists are currently analyzing x-ray data from several past space missions and are preparing instrumentation intended for future flights.

In one such developmental effort, SAO has been working with NASA and industry on the Advanced X-ray Astrophysics Facility (AXAF), a major space observatory planned for launch sometime late next decade. During the past year, polishing and assembly were

completed for a mirror system comparable to that planned for AXAF. Testing with NASA's special x-ray calibration facility showed the mirror's figure and surface finish met predicted performance specifications, and its ability to focus reflected x-rays was some 20 times better than the mirrors on the highly productive HEAO-2 (Einstein) Satellite designed by SAO scientists in the 1970s. The success of this preliminary experiment will allow the research team to proceed to the AXAF mirror fabrication with some confidence.

In March 1989, a massive flare on the surface of the Sun, the third largest on record, created a geomagnetic storm on Earth that disrupted radio communications, blew out power in Canada, and produced auroral displays seen as far south as the Gulf of Mexico. By lucky chance, a rocket-borne x-ray telescope using a new multi-layer mirror was launched from New Mexico in time to observe this gigantic solar eruption. This SAO-designed instrument obtained high resolution x-ray images of the flare's onset phase, which, when combined with simultaneous observations in other wavelengths, have provided new insights into the physical processes powering these events. The data suggest that flares may be triggered by some catastrophic instability in an arcade of magnetic loops extending into the Sun's outer atmosphere, or corona. The flare energy seems to be channeled along magnetic field lines from the x-ray flaring region out to optically bright areas in the solar chromosphere, that region between the Sun's surface and corona.

Approximately ten years ago, the x-ray source known as 4U2129+47 was linked with a highly variable star that dimmed and brightened every 5.2 hours. Scientists thought that the two objects formed a binary system in which the optical variability was due to the changing orientation of the x-ray-heated face of the visible star. Moreover, the central x-ray-emitting neutron star was probably blocked by a disk of accreting material so any x-rays reached Earth only after scattering off this disk in an x-ray halo. Observations of 4U2129+47 during a period of x-ray quiescence by SAO scientists and colleagues produced new information indicating that this is really a triple star system. Indeed, the observations provide the first convincing evidence for such a system among the special class of objects known as low-mass, x-ray binaries. Further study should reveal additional information about the three components, including their masses, relative separations, and orbital motions, and, by inference, more about the origin and evolution of triple systems.

Optical and Infrared Astronomy - Optical and infrared astronomy research at SAO ranges from studies of the large-scale structure of the universe to the formation and evolution of stars. The many areas of interest include the kinematics of the halo of our galaxy, active galactic nuclei, gravitational lenses, supernovae, the chemistry of the Earth's atmosphere, and the dynamics of globular clusters and galaxies. In support of this research, SAO operates the Fred Lawrence Whipple Observatory in Arizona, site of the Multiple Mirror Telescope, the world's third largest optical telescope, jointly run with the University of Arizona. Other optical telescopes at the Whipple Observatory are used for large-scale surveys and observations; and a 10-meter-diameter light collector, the most sensitive of its type, is used for ground-based searches for high-energy gamma rays. In collaboration with Harvard, SAO also operates the Oak Ridge Observatory in Massachusetts, where a variety of instruments for research range from asteroid orbital determinations to the search for extraterrestrial intelligence.

The Center for Astrophysics Redshift Survey, an ambitious project to map the three-dimensional distribution of some 15,000 galaxies in the northern sky, is now approximately two-thirds complete and has revealed the galaxies to be spread across

giant "sheets" surrounding vast voids. During the mapping this year, evidence was found for one structure more than 400 million light years across. The existence of such an extraordinarily large structure poses serious questions about current theories concerning the origin and evolution of the universe.

While making extremely accurate measurements of the radial velocities of bright stars to detect periodic motion, SAO scientists discovered several low-mass companion objects. These otherwise invisible objects could be the elusive "brown dwarf stars" thought by some theorists to make up much of the mass of our galaxy.

Scientists in this division are actively developing new instrumentation for both ground-based and space optical and infrared astronomy. In addition to the experiment selected for flight aboard a Small Explorer Satellite, other instruments include two-dimensional-array electronic detectors, optical-fiber-fed spectrographs, and a prototype two-element optical and infrared interferometer with a baseline approximately 50 meters long to be erected at the Whipple Observatory.

Planetary Sciences - Research in planetary sciences at SAO strives to understand the planets, satellites, and other small bodies of the solar system, as well as the processes that created them out of a great, whirling, primordial cloud of gas and dust billions of years ago.

For example, in an attempt to duplicate the physical processes present in that early solar nebula, laboratory studies were made on the evaporation of elemental constituents in meteorites. One such experiment made the first measurements of the fractionation of the elements into different isotopes.

Among the more interesting events reported by the Central Telegram Bureau and the Minor Planet Center were the discoveries of six comets in the vicinity of the Sun made by a space-borne coronagraph. A new study of the two dozen or so known "sun-grazing" comets, including some thought to have crashed into the solar surface, showed that all could have originated from the breakup of a single, large, progenitor comet in the fourth century B.C.

Adding new insight on the dynamics of the early solar system, a study of the stability of asteroids orbiting between Jupiter and Saturn showed that none could persist there for longer than some 20 or 30 million years.

Special chlorine- and potassium-solution detectors deep inside the Homestake Mine in South Dakota obtained data that will help better determine the cosmic-ray background for the solar neutrino flux, a measurement particularly crucial in this period of increasing solar activity.

Radio and Geoastronomy - Research in radio astronomy attempts to understand the structure, evolution, energy sources, and ultimate fate of those astronomical objects throughout the universe that emit radio waves. As pioneers in very long baseline interferometry (VLBI), SAO scientists use this radio observing technique to measure drifts among the continents, to probe the interior of the Earth, and to determine the distances to cosmic sources and study their structures.

A major effort has been to measure the size of our own galaxy and the distances to neighboring galaxies. By charting the relative motions of water-vapor masers surrounding a newly formed massive star, SAO scientists can determine with high precision the distance to that star. Over the past few years, this technique has been

used to measure the distances to six such masers distributed throughout the Milky Way. Scientists have made similar measurements of maser complexes in nearby Galaxy M33 that may result in the first direct determination of that galaxy's rotation.

SAO scientists organized and participated in the first intercontinental VLBI observations of methanol masers, a type occurring in the vicinity of other masers but that mark a distinct episode in the development of new massive stars.

Various VLBI arrays were also used to measure the properties of relativistic jets emanating from quasars and active galaxies. The goal is to understand how particles are accelerated to velocities near the speed of light and why they are confined into such well-collimated streams. For example, one experiment using 18 antennas imaged the structure of the jet in Galaxy M87 with unprecedented clarity. As part of international teams, SAO scientists also conducted VLBI experiments at millimeter wavelengths, achieving resolutions as fine as 50 microarcseconds, or sharp enough to produce images of the core regions of galaxies.

Using a 1.2-meter-diameter radio telescope installed at SAO last year, a sensitive survey of carbon monoxide distribution in the little-studied outer portions of the Milky Way led to the identification of two giant, star-forming regions. Other observations of carbon monoxide in the nearer Perseus spiral arm of our galaxy provided new details on the size and mass distribution of molecular clouds in the vicinity of stellar associations and supernova remnants, a vital step toward understanding the process of star birth in such clouds.

SAO continued its leadership in the development of instruments for astronomical research, including highly stable atomic clocks built to support programs of VLBI, deep space tracking efforts, and national time-keeping programs. For example, SAO-built clocks played a vital role at those NASA stations around the world monitoring the Voyager spacecraft encounter with Neptune.

Several division projects involve the development of instrumentation for future applications in space and on the ground. The POINTS (precision optical interferometer in space) system will provide astrometric measurements of stars with a resolution of 5 microarcseconds, thus providing data necessary for calibrating the cosmological distance scale as well as for improving tests of general relativity. Another study is analyzing the electrical conductivity and mechanical characteristics of the long tethers to be deployed from the space shuttle. Finally, the so-called last frontier of ground-based astronomy soon may be conquered by an array of six submillimeter-wave radio telescopes now being designed at SAO. SAO appointed a project director, and established a laboratory for developing special, high-technology submillimeter receivers.

Solar and Stellar Physics - Research in solar and stellar physics is concerned with understanding the physical processes underlying the behavior of the Sun and other stars. Stars like the Sun are studied to understand the dependence of observed properties on factors such as their age, composition, and physical association with others in pairs and groups. Of particular interest is the behavior of hot gas under varied conditions--in the Sun's interior, in the outer atmospheres of stars, in the space between the stars, and in the material ejected by young stars and supernovae.

SAO scientists continued their studies of stars in the early stages of development, with an emphasis on the circumstellar disks of gas and dust thought to surround all young stars as the precursors of planetary systems. Dark clouds were

surveyed to determine the statistical importance of eruptive disk accretion in star formation. Other studies led to improved understanding of how material from these disks falls onto the surfaces of the still-forming central stars.

Other studies of cool stars in binary systems led to the discovery that high-temperature emissions seen from such systems may be the result of collisions of the stellar winds pouring out from the two objects as they orbit each other.

One outstanding question in solar physics is what heats the Sun's corona, or outer atmosphere, and then accelerates it outward into interplanetary space as the solar wind. To investigate that region where the solar wind originates, SAO scientists are preparing an Ultraviolet Coronal Spectrometer (UVCS) for flight aboard the joint U.S.-European Solar Heliospheric Observatory (SOHO) sometime in the next decade. Also, observational and theoretical studies of solar structure, heating, and energy transport have led to a new model that seems to account for the previously unexplained near constancy of the solar wind mass flux.

SAO scientists are also studying magnetic activity cycles in other stars for clues to understanding how similar cycles in the Sun produce diverse geomagnetic phenomena and their possible links to terrestrial climate change. A new research tool being used for these observations is the Automatic Photoelectric Telescope (APT), a fully robotic instrument ideal for long-term monitoring of cyclic behavior. As a leader in the development of APTs, SAO has begun efforts to establish a global network of such instruments.

Optical speckle interferometry is an observing technique used to measure very small angles, e.g., the diameter of a star or the separation between two or more closely spaced objects. A series of several thousand individual frames are taken during each observation and then combined by computer to form a composite image representing the highest resolution attainable by ground-based telescopes. In addition to observations of Supernova 1987A, including the first direct optical measurement of a supernova's expanding shell, SAO scientists used this technique to detect disklike and halolike structures around stars, a possible molecular cloud around the star Mira, and the presence of bright features on the surface of the star Betelgeuse.

Theoretical Astrophysics - Theoretical astrophysicists study the objects and systems of the universe by means of mathematical analysis and computer simulations. Although usually intended to provide interpretations of observed phenomena, this research often results in the prediction of new phenomena not yet seen. Most investigations involve independent work by individual theorists, but collaborations among individuals and other groups at SAO is common, especially in four broad areas: cosmology and the early universe, supernovae and nucleosynthesis, stellar and planetary collisions, and atomic and molecular physics.

One of the most exciting theories of cosmology is the concept of an "inflationary universe," in which the infant cosmos suddenly and dramatically expanded to a significant fraction of current size within a fraction of a second of its creation. Although this theory solves many cosmological problems posed by the observed distribution of matter in the present universe, it is not without its own difficulties. Several investigations this year concentrated on how the geometry of large-scale structure in the universe might be made consistent with inflation models.

Supernova 1987A was not only a bonanza for observers; it also stimulated much theoretical work on supernova hydrodynamics and related nucleosynthesis. A major surprise was the early detection of nuclear gamma rays from the supernova, thus implying that materials synthesized at great depths had been mixed toward the surface faster than expected. SAO investigations of this problem found that an overlooked process--convection in the supernova's expanding layers--could produce the required mixing.

Even 20 years after the Apollo missions, the origin of the Moon remains a mystery. In one of several computer programs developed at SAO and HCO to simulate stellar and planetary collisions, a planetary body is made to strike the early Earth under conditions that might lead to the formation of a moon. The result of this simulated cataclysm is the creation of a large secondary body with a mass and other physical characteristics similar to our Moon.

Theoretical studies of atomic and molecular physics have produced models for the atmospheres of other planets that may prove helpful in understanding the chemistry, physics, and hydrodynamics of the Earth's own complex, protective, and increasingly beleaguered atmosphere.

Scientific Equipment Replacement and Improvement Program - Since FY 1984, SAO has been undertaking a comprehensive long-term program to replace and improve obsolete laboratory and computer equipment. Additional funding received in FY 1987 offset cumulative erosion of the SAO base in the preceding several years. With these funds SAO has made significant progress in developing a network for computers distributed throughout SAO. An Observatory-wide Ethernet system now links a new Convex computer, new work stations, and their associated disc and tape drives. The Observatory's aging and overworked VAX computers have been replaced by a cluster of more modern computers with far greater computing power. In addition, microprocessor-controlled data acquisition and data presentation capabilities obtained with these funds have substantially enhanced the effectiveness of existing laboratory equipment.

Development of Scientific Instrumentation - Since FY 1989, the Institution has requested support for the nonpersonnel costs for two projects for the Smithsonian Astrophysical Observatory as no-year funding under the Major Scientific Instrumentation line-item:

- the development of an array of submillimeter telescopes;
- the conversion of the Multiple Mirror Telescope.

Both of these cutting edge scientific projects involve the fabrication of major new instrumentation that will take a number of years to plan, design, and complete. The Institution anticipates the development of the submillimeter array to continue through the mid-1990s; it will require total funding currently estimated at \$30 million (1987) or \$32.4 million (1989) for construction on a continental U.S. site; the cost would be about 25 percent higher if the Institution locates the array on a prime mountain site in Hawaii. The conversion of the Multiple Mirror Telescope, which SAO expects to complete by FY 1995, will require total estimated funding of \$10 million (1987) or \$10.8 million (1989).

Facilities Development - With funding provided in FY 1988 and FY 1989 as part of the construction appropriation, SAO is designing and will construct a new base camp for the Whipple Observatory. The base camp will include an Administrative Building

for purchasing, fiscal, engineering, and secretarial support; a visitor center, to serve as the focal point for public tours; a vehicle maintenance shop; a warehouse; and outside parking for approximately 60 vehicles to accommodate visitors, staff, shuttles, and heavy equipment used for road maintenance.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, SAO requests an increase of 2 workyears and \$380,000 to strengthen theoretical research (2 workyears and \$130,000); to support rent increases (\$200,000); and to support the infrared and optical telescope array program (\$50,000).

Also, the Institution requests no-year funding in the Major Scientific Instrumentation line-item for the nonpersonnel support to complete the design and begin construction of the submillimeter telescope array and to continue the conversion of the Multiple Mirror Telescope to a single mirror, 6.5 meters in diameter instrument. In addition, the FY 1991 request for SAO reflects an increase of 12 workyears and \$782,000 for personnel costs and rent associated with the submillimeter telescope array. Since this increase is related to the Major Scientific Instrumentation request, the justification for these positions appears in the Major Scientific Instrumentation section of this budget.

Strengthen Theoretical Research (2 workyears and \$130,000) - Scientific data are useless until they are interpreted and tied into the framework of existing knowledge. Theorists also play a vital role in suggesting the data that are important to obtain. SAO is exceptionally strong in observational work, but lacks a balancing strength in theoretical astrophysics needed to make the most of its instrumental and observational capabilities. Two additional theorists in FY 1991 will help correct this imbalance.

Theoretical studies could make a significant contribution to a variety of observational programs at SAO, such as the large scale structure of the universe, the explosive processes taking place in the centers of distant galaxies, and the formation of stars and planetary systems. Ongoing theoretical research at SAO that could benefit from interactions with the new theoretical astrophysicists would include studies of the very early history of the universe, of the formation of the solar system, and of the mechanisms that power supernova explosions.

Astrophysics also holds the promise of contributing significantly to our understanding of subatomic processes that we will never be able to study with even the most powerful accelerators on earth. A strengthened theoretical effort at SAO would thus play an important role in linking astrophysics with experimental high energy physics.

Rent (\$200,000) - The Institution's request for an increase of \$200,000, to meet projected increased costs of rent for SAO's operations at Cambridge, has the following components:

New Space (\$42,000) - Partly because of Federal project expansion and mostly because of SAO's success in winning four major competitions for NASA sponsored projects--ranging from submillimeter astronomy to high-energy astrophysics--SAO will require additional space in Cambridge. SAO apportions its rent between Federal and Trust funds in relation to the total cost of rent and the space occupied. In order to satisfy space requirements, SAO will rent an additional 15,000 square feet. The Federal share of this increase, slightly under one-third, is estimated at \$42,000 per year.

160 Concord Avenue Property (\$78,000) - SAO's five-year lease at 160 Concord Avenue expires in November 1990. SAO intends to renew the lease for the next five-year period. Based on current market conditions in Cambridge, SAO estimates the Federal portion of this increased cost at \$78,000 per year.

60 Garden Street Property (\$80,000) - SAO leases approximately 90,000 square feet of space from the Harvard College Observatory. Rental is negotiated annually and is dependent on the actual costs of operating and maintaining the buildings during the previous year. Later in this calendar year, the lessor will incur two major expenses: (a) the replacement of a badly leaking roof that is too old to be repaired usefully--bids just received indicate that the cost will be about \$200,000; and (b) the replacement of transformers that were recently determined to have PCB contaminants well in excess of the environmental limit--the estimated cost of this replacement is \$150,000. Considering the deferred maintenance situation at the Harvard College Observatory, expenses of this order per year over the next several years may be typical until the maintenance "backlog" is eliminated, i.e., these expenses are expected to be about \$250,000 per year. Operating expenses such as for water, heat, and electricity have also increased significantly. The estimate for the total effect of these increases in operating expenses in FY 1991 is about \$100,000 per year, or more. Thus, the total estimated cost of deferred maintenance and increased operating expenses is \$350,000 per year, or more. Since (1) SAO occupies approximately 70 percent of the Harvard College Observatory's floor space, and (2) the Federal share of SAO's rental is slightly under one-third, the impact on the Federal budget for this space will be \$80,000 per year, or more.

Infrared and Optical Telescope Array Program (\$50,000) - This program will strengthen the Institution's research by helping to create the ability to make high angular resolution images, in the optical and infrared spectral region, of faint astronomical objects including stars, multiple stellar systems, and eventually the nuclear regions of nearby galaxies and the closest quasars.

SAO has world-class researchers who carry out high-resolution studies making extensive use of radio and, soon, submillimeter arrays. The Infrared and Optical Telescope Array (IOTA) will extend the ability to make such studies to the newly developing frontier of optical and infrared arrays.

The IOTA program is a cooperative effort with Harvard University, the Massachusetts Institute of Technology's Lincoln Laboratory, the University of Massachusetts, and the University of Wyoming. IOTA could be the world's first long-baseline (50-meter-class) optical and infrared interferometer, and it will help to ensure continuing United States leadership in this field. For FY 1991, the funds requested will allow completion of the construction of this two-telescope facility on Mt. Hopkins, on-site testing of the system, and the beginning of operations.

This request provides forefront research capabilities and ensures that the Smithsonian will continue to attract the caliber of scientists needed to enhance the Institution's research programs and to maintain its leadership in astrophysics research.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Unrestricted general funds come primarily from overhead charged on contracts and grants. These funds are used to support administrative positions and some other administrative costs of SAO. Special

purpose funds come from two sources: external users of SAO's Computer Center and the Institution's Trust funds, with the latter providing by far the larger share. The former may be used for research and computer-related purchases in future years. Trust funds provide direct support for some research as well as for the fellowship and visiting scientist programs, the largest uses of special purpose funds.

Restricted Funds - Restricted funds consist of specific endowments as well as gifts from individuals, foundations, or corporations earmarked for particular research purposes.

Government Grants and Contracts - SAO receives the majority of its funds through government agency contracts and grants for research in its particular areas of expertise and experience. This research is often carried out in cooperation with both government and academic institutions in the United States and abroad. In FY 1991, increased funding is expected through contracts from NASA to SAO for development of instrumentation for the Advanced X-ray Astrophysics Facility (AXAF), the Solar Heliospheric Observatory (SOHO), the Submillimeter Wave Astronomy Satellite (SWAS), and the Large Area Modular Array of Reflectors (LAMAR).

SMITHSONIAN TROPICAL RESEARCH INSTITUTE

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	125	5,738	3	211	-	276	-	344	9	578
FY 1990 Estimate	127	5,664	3	222	1	355	-	250	12	1,020
FY 1991 Estimate	144	6,845	3	222	1	345	-	275	12	1,020

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Tropical Research Institute (STRI) is the Nation's premier center for basic research on the ecology, behavior, and evolution of tropical organisms. Located in Panama, STRI conducts scientific investigations throughout the New and Old World tropics. In addition to scientific staff; visiting scientists from the world over conduct research at STRI. The Institute applies results of this basic research to carefully selected conservation and resource management problems, seeking viable alternatives to traditional agricultural and forestry practices that contribute to the massive deforestation of the world's tropical forests. The terms of the Panama Canal Treaties of 1979 designate STRI as the custodian of the Barro Colorado Nature Monument, a 12,000-acre tropical nature preserve located in the Panama Canal. The preserve consists of Barro Colorado Island (BCI) and five adjacent mainland peninsulas. Other STRI facilities include a marine laboratory at Naos Island (on the Pacific Ocean); a marine laboratory at Galeta Point and a field station in the San Blas Islands (both on the Atlantic Ocean); and a research library, laboratories, conference and study facilities, and administrative headquarters in Panama City. STRI scientists also engage in collaborative research with colleagues in U.S. universities and in other tropical countries, including Malaysia, India, Madagascar, Kenya, Senegal, Costa Rica, and Venezuela.

For FY 1991, STRI requests an increase of 17 workyears and \$1,181,000 to strengthen and expand its research programs in global change (3.5 workyears and \$319,000) and canopy biology (.5 workyear and \$245,000); staff and equip the new laboratory on Barro Colorado Island (3 workyears and \$275,000); enhance STRI programs in safety and security (3 workyears and \$130,000); meet increased infrastructure support needs (5 workyears and \$152,000); and commemorate the Columbus Quincentenary as cohost to the Fourth World Congress on National Parks to be held in Panama in 1992 (2 workyears and \$60,000).

PROGRAM - The Smithsonian Tropical Research Institute is the Nation's leading international center for basic research in tropical biology. STRI performs four major functions:

- conducts fundamental research on the ecology, evolution, and behavior of tropical plants and animals, including mankind;
- provides major facilities and logistical support for the international scientific community to study both terrestrial and marine tropical biology;
- supports environmental education, conservation and management of tropical ecosystems;
- protects and manages the Barro Colorado Nature Monument under a treaty-assigned responsibility.

A compelling need exists for improved understanding and conservation of tropical ecosystems. Conversion of tropical forest to scrub and grassland can affect regional and even global climatic patterns. It may adversely affect the North American environment. Extinction of species eliminates potential sources of medically and commercially important natural products. STRI's basic research provides the essential science base for the effective management and conservation of these resources.

In FY 1989, STRI continued its long record of progress and achievement in research, facilities development, and international education and conservation. Research publications from work done at the Institute should exceed the more than 200 published in 1988. STRI's annual report and STRI Contributions to Research, an annual offprint of STRI publications, summarize current research projects. Descriptions of significant accomplishments and major program activities during FY 1989 follow:

Greenhouse Gases and Tropical Forests - Tropical forests absorb large amounts of carbon dioxide, an atmospheric gas strongly implicated in the greenhouse effect and global warming. STRI scientists, in collaboration with scientists at the Smithsonian Environmental Research Center in Edgewater, Maryland, have begun the first-ever studies on how carbon dioxide affects tropical plants. The studies include raising common tropical plant species at normal and twice-normal concentrations of carbon dioxide.

Raised carbon dioxide led to increased growth, photosynthesis, and efficiency of water use, and decreased respiration. Species varied strongly in their responses, indicating that rising carbon dioxide may alter the structure and dynamics of tropical forests. The results also suggest that intact tropical forests can help reduce the rate at which atmospheric carbon dioxide increases over the next decade. The next stage of this work will involve studying the effects of carbon dioxide in the upper forest canopy, where most growth and photosynthesis occurs.

Ecological Interactions between Animals and Plants - Tropical forests contain a wide range of species that are potential sources of medicines. Exploring plant-animal interactions is an excellent way to identify candidate medicines. STRI scientists have found that a common caterpillar protects itself from predators by feeding on a plant that contains compounds that most insects find unattractive or even poisonous. The chemicals affect sugar metabolism, and recent tests show that they are potentially useful in the treatment of a wide variety of disorders, from obesity to diabetes to AIDS. They also hold promise as a deterrent to insect pests such as locusts.

This research originally sprang from the interest of scientists in the striking migratory habits of the moth adults of the caterpillar. It demonstrates the potential

spin-offs of ecological research and the serendipitous nature of many important scientific discoveries.

International Forest Dynamics Project - The origin and maintenance of the great species richness in the tropics is a fundamental research interest at STRI. One important, long-term component of this program is the International Forest Dynamics Project, begun by STRI in 1980 with a 124-acre forest plot on Barro Colorado Island. STRI researchers supervise the mapping and measurement of more than 250,000 trees on the site every five years. The program has established sister plots in Malaysia and India and plans plots in other tropical countries.

A just-completed census of the Malaysian plot confirms the enormous biological diversity of tropical rainforests. Scientists have found 835 tree species, more than occur in all of the United States and Canada and more than twice the number found in the plot on Barro Colorado Island. The number of species in the Malaysian plot is the highest number recorded on a plot of this size.

From a knowledge of tree densities in tropical forests and their rates of survival, growth, and recruitment, foresters will be able to rapidly identify native species that have a potential for commercial reforestation. Because of the great species richness of many tropical forests and the low density of individual tree populations, researchers can obtain this information only from large-plot studies such as those conducted by STRI.

Effects of Global Change on Marine Species - The ocean conditions on which marine life depends may change substantially as a result of global warming. STRI scientists are examining potential changes through the long-term study of several species, primarily fishes.

Most species of tropical reef fishes reproduce by periodically sending larvae brood off into the open ocean to grow. The young later return to settle near the shore. Previously, many scientists thought that ocean conditions in the tropics did not affect this recruitment. STRI scientists have been testing this and other hypotheses for several years by monitoring spawning and settlement of fishes in the vicinity of the San Blas field station and the Naos marine laboratory.

All fishes studied so far have species-specific seasonal patterns of settlement that are in fact strongly affected by ocean conditions. The effect is strongest in the Pacific, where the environment shifts substantially between wet and dry seasons. The changes in ocean conditions that scientists expect as the Earth warms may therefore have severe effects on populations of fishes, many of which are important sources of food.

Biological Catastrophes - STRI's long-term basic research programs provide a context for evaluating environmental catastrophes. A major oil spill occurred in April 1986 near STRI's Galeta marine laboratory on the Atlantic coast of Panama, significantly affecting marine and intertidal communities. STRI is conducting a five-year study on the impact of the oil spill on biological communities for the Minerals Management Service of the U.S. Department of the Interior. The Institute coordinates an international team of more than a dozen scientists to compare the recovery of biological communities in spill-affected areas with natural population variation prior to the spill. Damage to coral, seagrass, and mangrove communities has proven to be more severe and enduring than suggested by less rigorous studies elsewhere. This work is providing invaluable guidelines for management of oil spills

in tropical and semitropical marine habitats. The findings are possible only because of the rigorous prespill research STRI conducted in the area.

Conservation Research - STRI scientists are developing agro-forestry techniques to produce a sustained-yield, economically viable buffer zone for the Barro Colorado Nature Monument. This zone will provide added protection against agricultural encroachment, regional climatic change, hunting, and forestry harvests. Scientists have planted native and introduced species of trees and crops together in a 2.5 acre "Forest Garden." All foliage in the plot is palatable to livestock. Many species fix nitrogen and improve soil fertility. Researchers can use the project as a model for expanded agro-forestry in the deforested areas within the Panama Canal watershed. It is also a model for buffer zone projects elsewhere in the tropics.

Molecular Evolution and Plant Physiology Initiative - With funding provided in FY 1988 and FY 1989, STRI has established a research program in molecular evolution and plant physiology. While STRI scientists have always made some use of molecular and physiological techniques, this support significantly enhanced their ability to undertake major research in these fields.

Molecular evolution studies permit STRI scientists to address basic questions concerning processes of species formation, the maintenance of genetic variation in populations, and the nature of population differentiation. The program has already yielded intriguing and even surprising results on how barriers like the Isthmus of Panama affect evolution and how the reproductive biology of a species affects its genome. Studies of tropical plant physiology are providing essential insights into the nature of plant adaptation to environment, information necessary to apply basic knowledge to the urgent problems of forest conservation and management.

Visiting Scientists - STRI promotes additional basic research in tropical biology by hosting several hundred students who work in association with the staff and visiting scientists from many countries. These scientists can pursue research in biologically rich environments without being intellectually isolated. Hundreds of scientists from major universities and research institutions from most of the States and all over the world ensure a continuing infusion of new ideas leavened by the long tropical experience of STRI's permanent staff.

During FY 1989, scientists from Princeton University and the U.S. Geological Survey continued research on the role of tropical forests and wetlands in the production of greenhouse gases, including methane and carbon dioxide. These gases have significant effects on regional and global climatic patterns. Deforestation and agriculture are likely to alter the dynamics of gas production and circulation, further complicating predictions about the future of tropical and extratropical climates.

Publications - Work at STRI resulted in the publication of more than 217 scientific papers and books during calendar year 1988. Staff and visiting scientists are currently involved in more than 160 research projects that will produce at least the same number of publications.

Fellowships, Conservation, and Environmental Education - Because of its location in Panama, STRI is in an excellent position to play two significant roles in the study and conservation of tropical environments. First, STRI actively engages in the education of creative scientists from tropical and nontropical nations. Approximately

80 men and women (half from Latin America) representing a dozen nations participated in STRI's academic programs in FY 1989.

Second, STRI is aware that the survival of tropical ecosystems depends on the combined efforts of international organizations, governments, the private sector, and people in the tropical countries themselves. STRI is both a committed leader and participant in tropical conservation efforts.

STRI's premier reference library for tropical studies enhances its educational function in tropical biology by serving STRI's staff, visiting scientists, and students from universities and secondary schools in Panama. Currently, the library serves more than 1,000 patrons per month.

STRI is deeply involved in conservation activities. The Institute works actively with the Asociacion Nacional para la Conservacion y la Naturaleza, a local affiliate of the Nature Conservancy, in its efforts to purchase and protect endangered natural areas. STRI also works closely with the Kuna Indians in their conservation and environmental education efforts in Kuna Yala, their autonomously governed reservation on the Caribbean coast of Panama.

STRI research is providing protocols for the eventual domestication and use of wild species as a standard component of Panamanian agriculture. Studies of fast-growing plantation trees and new crop plants are in progress on the mainland west of Barro Colorado Island. The results of these studies will provide local farmers with sustained-yield agricultural techniques that will eliminate the need to continually remove forest to provide new crop land.

Because the primary emphasis of STRI continues to be basic research, its understanding of tropical organisms and environments deepens and broadens over time. As a result, STRI is better capable of applying this knowledge to the increasingly serious environmental and economic problems confronting tropical countries. STRI's educational programs are producing greater interest and expertise among students in the tropics in the application of basic knowledge to practical problems.

Facilities - STRI's research facilities in Panama include the Barro Colorado Nature Monument, marine laboratories at Naos Island and Galeta Point, a field station in the San Blas Islands, and a cloud forest station at an elevation of 6,500 feet in western Panama. STRI also operates a research vessel for studies in both the Atlantic and Pacific Oceans. These facilities also serve as the home base for STRI programs in comparative and experimental research at numerous other sites throughout Panama and in other tropical countries.

The new Tupper Laboratory and Conference Center became operational during FY 1989. This facility provides STRI scientific staff and visiting scientists with modern office, laboratory, and conference facilities similar to those at major research universities. It supports development of plant physiology, molecular evolution, and global change programs at STRI. During FY 1990, STRI will complete construction of the new dormitory, kitchen, and dining hall on Barro Colorado Island, which will provide modest living facilities for the large number of researchers who use BCI.

As part of the Smithsonian's FY 1989 construction appropriation, STRI received funding to build a new laboratory facility, a vivarium, an insectary, and a growing-house on BCI. The FY 1990 construction appropriation request includes funding to

build a new laboratory and dormitory at Galeta, a new, larger field station in San Blas, and an 80-foot research vessel that will replace the aging R/V Benjamin.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, STRI requests an increase of 17 workyears and \$1,181,000 to strengthen and expand its research programs in global change (3.5 workyears and \$319,000) and canopy biology (.5 workyear and \$245,000); staff and equip the new laboratory on Barro Colorado Island (3 workyears and \$275,000); enhance STRI programs in safety and security (3 workyears and \$130,000); meet increased infrastructure support needs (5 workyears and \$152,000); and commemorate the Columbus Quincentenary as cohost to the Fourth World Congress on National Parks to be held in Panama in 1992 (2 workyears and \$60,000).

Global Change (3.5 workyears and \$319,000) - Tropical environments are changing rapidly. Deforestation proceeds at an unprecedented rate, threatening the extinction of many species before science has a chance to understand their ecological roles and explore their possible benefits. This destruction may have global consequences through effects on atmospheric water cycles, the production of greenhouse gases, and siltation of coastal marine habitats and other pathways.

The Isthmus of Panama is a key region for examining global change from both a biological and a geological perspective. STRI's permanent base in the tropics and multifaceted approach to tropical research make it uniquely suited for global change studies. The protected forest of the Barro Colorado Nature Monument is the only mainland tropical area under U.S. custodianship where long-term ecological studies are conducted.

STRI proposes to enhance its program in three aspects of global change research: long-term physical and biological monitoring, investigations of the biological and geological mechanisms of change, and conservation and management studies. The Institute foresees an eventual program of 12 fully supported scientific staff in the areas of paleontology, human biology, atmospheric sciences, environmental physiology, and conservation science, with full implementation achieved in FY 1994.

For FY 1991, STRI requests partial-year funding of 3.5 workyears and \$169,000 to hire in April 1991 three scientists, three technicians, and a procurement clerk for the program, and \$150,000 for equipment and research support for the scientists. STRI will request additional funding in FY 1992 to annualize these positions and to hire and support two additional scientists and technicians. Full-year funding for the 7 positions filled in FY 1991 will be \$338,000 plus \$60,000 in research support, for a total of \$398,000.

The urgent issues of deforestation, global warming, and other aspects of global change demand forceful attention. STRI has been performing research with relevance to these issues for more than 60 years. With STRI's experience, location, and newly enhanced research facilities, expansion of its program in global change research will permit STRI to increase its contributions substantially in this important area of inquiry.

Canopy Biology (.5 workyear and \$245,000) - Of all the habitats on Earth, the least studied and understood is not the bottom of the ocean or the icy terrain of the poles. Arguably, the least understood is the upper canopy of the endangered tropical rainforests, the richest single habitat on Earth. Biologists know little about the canopy because no safe, efficient technique has been established for reaching it.

STRI proposes to develop and implement a canopy access system that will remedy this critical deficiency in our knowledge of a key natural resource. The system will use the simple, well-tested, and robust technology of tower construction cranes that will be erected in forests in the Barro Colorado Nature Monument. Scientists in a gondola will reach sites ranging from the lower through the upper canopy over more than 1.5 acres with each crane system.

To implement the program fully, STRI will purchase and erect two cranes, each with a custom-made, instrumented gondola. Two systems are needed to make rigorous comparisons between sites and to ensure adequate coverage of the forest. Each system will require a crane operator and technician, and the overall program will require a forest ecologist to implement and run it.

For FY 1991, STRI requests funds to hire the forest ecologist (.5 workyear and \$39,000) and \$206,000 to purchase and install one crane. STRI will require additional funding in FY 1992 to annualize the position, to hire the crane operators and a technician, and to purchase instrumentation. The second system will be purchased in FY 1993. Full-year funding for the ecologist will require \$78,000 plus \$20,000 in research support, for a total of \$98,000. Other personnel (2 workyears and \$48,000) and instrumentation (\$60,000) will require an additional \$108,000 in FY 1992.

STRI's canopy access system promises to revolutionize the study of tropical forests just as SCUBA diving revolutionized marine biology. The canopy access system will be an integral part of STRI's global change research program. Its potential uses include research on biological diversity, seasonal and long-term changes in populations, the effects of disturbance, ecological interactions between plants and animals, and physiological mechanisms and effects of global warming. Scientists will be able to bring laboratory instruments directly into the canopy to address key questions such as the role canopy trees play in the transfer of greenhouse gases between forest and atmosphere. The data acquired with the system will provide critical input for global climatic equations.

Staffing and Equipment for New Laboratory on Barro Colorado Island (3 workyears and \$275,000) - Modernized facilities to house laboratory equipment and computers are essential to complement more traditional observational field studies. STRI is constructing a new laboratory complex on Barro Colorado Island to replace several obsolete structures as part of its facilities master plan. The complex should be completed by mid-FY 1991. STRI must expand current maintenance and plant services essential for the new, more sophisticated building.

For FY 1991, STRI requests partial-year funding of 3 workyears and \$71,000 for nine positions. STRI must have five new facilities management positions: a maintenance engineer, a maintenance mechanic, an air conditioning mechanic, an electrician, and a custodial worker. To service the expanded research activities in the new laboratory, STRI must also have four new support positions: an animal care technician, a plant growing house technician, a general laboratory technician, and a secretary. STRI will fill the position of maintenance engineer in April 1991, and the remaining eight new positions in July 1991. STRI will require additional funding and workyears in FY 1992 to annualize the partial-year costs of these positions. Full-year funding for these positions will require 9 workyears and \$252,000.

The total requirements for furnishing and equipping the new laboratory on BCI will be \$385,000, including scientific equipment (\$260,000), basic furniture and furnishings (\$100,000), and health, safety, and general maintenance equipment

(\$25,000). For FY 1991, STRI requests \$204,000 to begin these purchases. Continuation of this funding in FY 1992 will complete the purchase of this equipment.

For more than 40 years, STRI has provided field research and logistical support for scientists from throughout the world to study at Barro Colorado Island. With the new laboratory facility fully staffed and equipped, STRI will continue to fulfill its responsibilities to these researchers studying tropical biology.

Safety and Security (3 workyears and \$130,000) - The dual pressures of deforestation and population growth have forced STRI to enhance vigilance over the physical safety and security of the STRI installations.

Patrolling the STRI grounds is a seven-days per week 24-hour per day function. The addition of two game warden positions will increase the staff to 16 game wardens and permit STRI to improve the protection of the Nature Monument and the personal security of personnel. Funds will provide two game wardens (2 workyears and \$34,000). STRI anticipates requesting two additional game wardens for FY 1992 and FY 1993 in order to complete necessary staffing levels.

The recent growth of STRI installations and research programs has made the management of its safety programs more complex. Managers and supervisors alone have assumed the responsibility of safety in operations. A specialist is needed to administer a program for safe storage of chemicals and hazardous substances, to provide advice on the safe operation of the sewage treatment plants at STRI, and to coordinate overall safety programs. STRI has an additional need for equipment and expert advice in other areas of safety, such as electrical systems and fire protection. STRI requests funds for a safety specialist (1 workyear and \$32,000) in chemical substances, including radionuclides, and \$14,000 to acquire safety equipment and contract professional expertise for the other necessary safety systems.

To complete this security and safety request for FY 1991, STRI seeks \$50,000 to charter airplane services to reach the research facility in the San Blas Archipelago off the Atlantic coast of Panama. STRI scientists and visitors now use a regularly scheduled airline to reach the San Blas research station. The service and safety of this airline, however, has deteriorated rapidly in the last year, evidenced by a crash landing witnessed by STRI personnel. The airline presently has only three planes to service about ten airstrips in San Blas. Since the San Blas research station is scientifically very important and productive, STRI cannot afford interruptions in transportation. An alternative charter company can provide safe and efficient services but requires regularly scheduled charter flights on a yearly basis for the service to be cost effective. Funds of \$50,000 will charter airline services to reach the San Blas research station.

The safety of STRI staff and guest researchers is a compelling issue. The time is critical for STRI to not only enhance security to protect the area from increasing incursions by armed poachers but also to supervise the proper handling of hazardous materials in order to protect all from injury.

Infrastructure Support (5 workyears and \$152,000) - The growth of research programs at STRI in recent years demands the accompanying enhancement of support personnel and services. By strengthening the technical support, STRI will improve the services provided to scholars.

The request for a property manager (1 workyear and \$32,000) stems from an audit recommendation to centralize the property management functions now handled long distance by the property managers for the Smithsonian in Washington, D.C. The property manager will facilitate the sharing of scientific equipment among scientists in the physically separated STRI installations.

The timely publication of scientific research results is an essential part of the Smithsonian's and STRI's mission. A writer-editor (1 workyear and \$32,000) will assist all staff scientists in preparing manuscripts for publication and thereby help increase their productivity.

A personnel specialist (1 workyear and \$32,000) will help STRI handle local aspects of personnel administration for about 140 employees. This increase will bring STRI staffing into line with recommendations in a recent government-wide study that each personnel specialist handle about 72 employees.

With the recent completion of the modern Tupper Laboratory and Conference Center Building and the growth of the molecular evolution programs, STRI has acquired complex scientific equipment. The obvious trend is for scientific equipment to become more electronically sophisticated. An electronics technician (1 workyear and \$39,000) will help maintain this state-of-the-art equipment and keep the research progressing. Electrical maintenance is essential in the tropics, where environmental conditions may be particularly harsh and backup equipment is not conveniently available.

Finally, the request will provide a clerk (1 workyear and \$17,000) for the STRI visitors' office. Research conducted by STRI staff is constantly complemented and enriched by the research of visiting scientists at STRI's installations. To make visitors' time at STRI scientifically more productive, the Institute must facilitate logistics. This necessity of the clerk's position was identified after an extensive examination of the need to reorganize services to visiting researchers.

Acquiring these support services guarantees the retention of STRI's distinguished visiting scientists and students and helps ensure that the Smithsonian will retain its preeminent international position in tropical research.

Columbus Quincentenary (2 workyears and \$60,000) - STRI is planning to commemorate the 500th anniversary of Columbus's voyages by co-sponsoring the Fourth World Congress on National Parks. The Congress will highlight recent progress in park development in Latin America, including the Barro Colorado Nature Monument, and will foster increased regional and international cooperation. By sponsoring this Congress, STRI will make a permanent contribution to international scientific exchange of information on park management and conservation.

The International Union for Conservation of Nature and Natural Resources (IUCN), the world's major nongovernmental conservation organization, has long been a focal point for international concerns about national parks. Once a decade, IUCN organizes a congress of scientists, park managers, policy makers, and interested media to discuss the world's most pressing issues in national park development and maintenance. The last such conference, held in Bali in 1982, produced important recommendations now being implemented globally by park managers. The Bali Congress resolved to hold the next decade session in the neotropics in 1992 to celebrate the Columbus Quincentenary and to focus on environmental issues in this symbolic year.

For FY 1991 through FY 1992, STRI will request funding to hire a temporary staff of three positions to fulfill its host responsibilities and to support the travel costs of Third World participants to this Congress. For FY 1991, STRI will hire a conference coordinator and secretary (2 workyears and \$53,000) to prepare for the Congress and requests \$7,000 for office equipment, advance publicity, and travel. For FY 1992, STRI will seek an assistant coordinator along with additional funding for travel costs.

Nowhere is the problem of establishing and managing national parks more critical than in the tropics, where human pressure is eliminating vast areas of tropical forests. The 500th anniversary of Columbus's voyages of discovery provides an ideal opportunity to organize the developing world and to establish policies for resource management before the loss of forests leaves few options. STRI's role in organizing the Congress will be an expression of our Nation's commitment to protect the world's natural resources.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds derive from a variety of sources, including receipts and collections from users of Barro Colorado Nature Monument facilities (20 U.S.C. 79b (d)) and annual allotments. Such funds support, in part, the salaries and related costs of the fellowship program, the senior sabbatical program, insurance, supplies, and a long-term collaborative research program with the Forest Research Institute in Malaysia. Funds also support a short-term fellowship program in tropical biology; visiting scientists and students; field research; seminars and lectures; and environmental, conservation, and education activities in Panama.

Restricted Funds - Funds are in the form of restricted endowments that specify the use of the donation or bequest and gifts and grants from individuals, foundations, organizations, or corporations for specific purposes. These funds further scientific research related to the biological, ecological, and behavioral processes that serve as the basis of tropical ecosystems; research related to geophysical events; publication and distribution of research results; and studies relating to endangered tropical environments. Continuing support from the Exxon Corporation provides short-term tropical biology fellowships and assistance to 30 students from developing Latin American countries.

Government Grants and Contracts - Beginning in FY 1987, the Minerals Management Service of the U.S. Department of the Interior awarded a \$3 million contract to fund a five-year study of the catastrophic oil spill at the Galeta field station.

SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	29	1,418	2	100	-	105	-	10	2	213
FY 1990 Estimate	31	1,532	2	100	-	98	-	22	2	390
FY 1991 Estimate	37	1,871	2	100	-	99	-	15	2	400

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Environmental Research Center (SERC) in Edgewater, Maryland, performs basic scientific research on coastal land/water systems. SERC currently occupies 42,000 square feet of laboratory, office, educational, and support space and 2,600 acres of land on the Rhode River, a tidal river system. The interdisciplinary staff, visiting scientists, and students study how land use, air quality, and weather variations affect the movement of nutrients, eroded soil, and other materials through the system; the dynamics of plant and animal populations; and the overall health of the system.

For FY 1991, SERC requests 6 workyears and \$339,000 to improve its building maintenance and administrative infrastructure support (3 workyears and \$89,000); and to reinforce its capabilities to collect and analyze research data on global climate change (3 workyears and \$250,000).

PROGRAM - SERC research aims to attain a better overall understanding of how coastal land/water environmental systems function. Research staff address a wide variety of ecological questions while conducting a long-term interdisciplinary study of a tidal subestuary of the Chesapeake Bay (Rhode River) and its watershed. This watershed contains a mosaic of upland and floodplain forests, marshlands, cropland, pasture, abandoned fields, and residential areas typical of the mid-Atlantic Coastal Plain. The Center has studied such problems as the effects of herbicides on plants in Chesapeake Bay, the effects of acid rain on deciduous forest and fish reproduction, and the role of riparian forests in alleviating pollution from agriculture.

Research Results - As part of a worldwide emphasis, SERC is conducting studies on the impact of global climate change on the environment. SERC published conclusions from three years of field research on the effects of elevated carbon dioxide concentrations on Chesapeake Bay tidal marshes. Researchers at SERC believe rising atmospheric carbon dioxide will have a major impact, both negative and positive, on climate and vegetation. To study this impact, SERC scientists compared *Scirpus olneyi* and *Spartina patens* communities. These species have different photosynthetic mechanisms for carbon reduction, and laboratory studies have found significant differences in their responses to elevated carbon dioxide. For *Scirpus*, elevated

carbon dioxide resulted in increased shoot density (30 percent), above and below ground plant material (30 percent and 27 percent, respectively), water use efficiency (133 percent), carbon/nitrogen ratio in above ground tissues (30 percent), and net photosynthesis (15 percent). However, with increased carbon dioxide, night-time respiration was decreased (40 percent) and the onset of fall senescence was delayed. For *Spartina*, elevated carbon dioxide had relatively little effect, but water use efficiency increased (77 percent) and night-time respiration decreased (32 percent). Based on the positive effects of elevated carbon dioxide on *Scirpus* and the negligible effect on *Spartina*, SERC scientists would expect *Scirpus* to become the more dominant species.

Understanding how the earth's atmosphere interacts with forests is crucial to understanding and predicting how climate change will proceed and how altered atmospheric composition will affect forest ecosystems. SERC researchers are studying this phenomenon in a plot of forest at the Edgewater site in Maryland. The scientists studied the chemical interactions of rainwater with the leaves of this area. Leaf species and solution pH (acidity level) both affected the leaching of inorganic ion from seven species found on the site. Decreasing rain water pH increased the rate of leaching of calcium and magnesium for all species, and the leaching rate of potassium and ammonium for most species. Most species take up sulfate at increased acidity levels. The studies indicate that the increased acidity of rainwater increases foliage nutrient loss through leaching.

SERC scientists continue long-term ecological studies of a dry tropical forest in the state of Quintana Roo, on the Yucatan Peninsula of Mexico. Results over a four-year period show significant annual differences in tree growth and litter production in response to variation in rainfall. However, blossoms and fruit production remained constant year to year. In September 1988, Hurricane Gilbert, the most intense tropical depression ever measured in the Caribbean, impacted this forest. The hurricane left trees standing but defoliated, with damage to most branches. Sprouting of new growth began within three weeks. Vines sprouted profusely in the understory. Leaf litter production nearly doubled. Scientists will follow the recovery of this forest from the hurricane in order to better understand the dynamics of these widespread but little-studied dry tropical forest ecosystems.

The Rhode River estuary is an extremely productive ecosystem. Past SERC research has shown that most of the primary production in this estuary is due to phytoplankton. New studies have focused on the role of planktonic microzooplankton in regulating these phytoplankton populations by grazing. Scientists use dilution and fluorescent dye-labeling techniques to measure grazing rates of specific zooplankton and the overall impact of zooplankton community grazing. In various field experiments, overall grazing by zooplankton reduced phytoplankton potential growth by 45 to 100 percent. The effects of phytoplankton density and species composition as well as the zooplankton species composition are important determinants of grazing rates. A better understanding of these grazing dynamics in conjunction with the effect on phytoplankton growth of nutrients, suspended sediments, light intensity, and dilution rates will allow a better understanding of phytoplankton populations in estuaries.

Solar Research Studies - The Smithsonian pioneered studies in the collection of data on the intensity and spectral distribution of solar radiation on the Earth's surface. For the past several years, a cooperative arrangement with the National Oceanic and Atmospheric Administration (NOAA) has enhanced these efforts. NOAA has provided office and laboratory space and utilities and has helped operate Smithsonian ultraviolet spectral radiometers at NOAA stations for Global Monitoring of Climatic

Change (GMCC). These measurements permit calculation of the concentration of ozone in the atmosphere and the dose of harmful ultraviolet (UV) radiation at the Earth's surface. When ozone concentrations decline, UV doses on earth increase, with potentially serious consequences. These Smithsonian UV measurements span a complete sun spot cycle, which averages 11 years. These unique data demonstrate the strong interaction of the solar sun spot cycle with the dynamics of ozone concentration changes in the stratosphere. The GMCC network will place into operation a new generation of spectral radiometer, under development at the Smithsonian, in FY 1990. It will allow more refined analyses of the atmospheric dynamics of ozone as well as applications in other regions of the solar spectrum.

Educational Activities - SERC provides a broad range of educational activities, including teacher-led field trips, self-guided nature trails, and guided tours. Groups of students and the general public observe firsthand a variety of natural habitats. A work/learn program enables students to work with scientists, both in the field and in the laboratory. Predoctoral, postdoctoral, and sabbatical programs for professionals at all levels enable visiting researchers to carry out collaborative or independent research at SERC. The results of SERC's research are disseminated through scientific journals, national and international scientific meetings and seminars, the training of scientists, and public education activities.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, SERC requests an increase of 6 workyears and \$339,000 to improve its building maintenance and administrative infrastructure support (3 workyears and \$89,000); and to reinforce its capabilities to collect and analyze research data on global climate change (3 workyears and \$250,000).

Administrative Support and Building Maintenance (3 workyears and \$89,000)- Administrative support and building maintenance are basic infrastructure requirements at SERC. Depending upon the time of year, staff, students, fellows, and visiting scientists at SERC number between 50 and 90. This number, as a whole, is increasing with the expanded activities at SERC. These researchers perform environmental research on the Rhode River and its watershed as it relates to coastal land/water systems. Another aspect of SERC's program is the increasing study of global climate change. To permit SERC researchers to focus solely on the various projects conducted at Edgewater, SERC requires a staff devoted to administrative duties. The requested secretary (1 workyear and \$23,000) will assist current staff in providing services to the researchers such as typing and preparing paperwork for personnel, payroll, and student and fellowship activities. With secretarial assistance in these areas, SERC scientists will be able to concentrate fully on research activities.

Maintenance of buildings is essential at the SERC facility. The recent construction at SERC resulted in the addition of attendant HVAC equipment. SERC requires daily maintenance of the plumbing and air conditioning in the 42,000-square-foot laboratory/office building space. Water systems in the older buildings require constant repair and replacement. The Institution's Office of Plant Services (OPlantS) currently provides HVAC and plumbing services to SERC on an as needed basis. However, because of SERC's remote location (40 miles from Washington), the present arrangement makes it impossible for OPlantS staff to respond to emergencies, such as water pipe breaks and sink overflows, in time to avoid water damage to facilities. Contract HVAC and plumbing services, costing approximately five times as much as Smithsonian personnel, is not a cost-effective alternative. The addition of an HVAC mechanic and a plumber to the staff at SERC will greatly improve the daily maintenance of the operating systems and ensure prompt response to emergency situations.

Global Climate Change Research (3 workyears and \$250,000) - The need and urgency for climate change research is well recognized both nationally and internationally. SERC is already deeply involved in research relevant to climate change at its Edgewater, Maryland site and at field research locations around the globe. To keep pace with the expanded study and collection of data on this subject, SERC requires additional personnel and advanced computer technology to properly manage and analyze this information.

As part of this research, SERC is studying the effects of increased atmospheric carbon dioxide concentrations and the interactions of the earth with the forest canopy. SERC is also working with the Smithsonian Tropical Research Institute (STRI) on a global climate change project. This program will compare data on the interaction of the atmosphere with the forest ecosystem at Edgewater with similar data from Barro Colorado Island in Panama. Global climate change initiatives, such as these, generate immense volumes of data. The proper management and analysis of these data bases are essential for accurate reporting of research results.

For FY 1991, SERC requests funds to hire an ecosystem modeler and data manager to manage and analyze the data bases, and a physical science technician to monitor quality control of research instruments and sensors. Funds also will support the upgrading of the SERC computer system.

The importance of global climate change underscores the growing need for continued research. The results of this research will increase the nation's and the world's understanding and knowledge of this subject and, therefore, assist scientists in developing future solutions to the problems associated with global climate change.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds, provided by allotments, support special events, work/learn and fellowship programs, and the salary costs of a docent coordinator and a public program director.

Restricted Funds - Donations, bequests, and foundation grants designated for specific subjects of investigation constitute these funds. For FY 1990, a grant from the World Wildlife Fund will continue to support investigation of the effects of land use changes in the Yucatan Peninsula upon migratory bird populations that nest in the Chesapeake region and winter in Mexico.

Government Grants and Contracts - Various Federal and State agencies supply funds for special projects conducted at SERC utilizing the expertise of the staff and the unique physical site characteristics. A grant from the Chesapeake Research Consortium supports research on the nutrient dynamics of the Chesapeake Bay watershed system, while a grant from the U.S. Department of Energy advances the study of greenhouse effects on marshes.

NATIONAL ZOOLOGICAL PARK

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	343	14,048	1	134	3	381	1	241	-	79
FY 1990 Estimate	346	14,638	1	134	3	661	1	1,223	-	132
FY 1991 Estimate	360	15,638	1	134	3	677	1	1,574	-	120

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Since 1889, the primary mission of the National Zoological Park (NZP) has been the advancement of science and the instruction and recreation of the people. The Zoo's living collection, open to the public, occupies 163 acres at Rock Creek Park in Washington, D.C. The Zoo also maintains the Conservation and Research Center, (CRC), a major conservation, animal breeding, and research facility on 3,150 acres in Front Royal, Virginia. Through its programs in research, conservation, animal health, and education, NZP serves the public and specialized audiences and promotes understanding of animal adaptations and evolution and the interaction of wildlife with the environment.

For FY 1991, the National Zoological Park requests an increase of 14 workyears and \$1,000,000 to support existing programs (11 workyears and \$460,000); expand its scientific and research equipment purchase program (\$400,000); establish a Genetic Resource Bank (2 workyears and \$90,000); and support the Conservation Training Program (1 workyear and \$50,000).

PROGRAM - The major programs of the National Zoo are living exhibits, animal management, animal conservation and propagation, research, and public education and information. At the Rock Creek site, NZP cares for more than 4,544 animals comprising 481 species and approximately 1,400 plant species. The Zoo chooses its species primarily for their interest to the public and their contribution to research and conservation. At the Conservation and Research Center, the Zoo keeps nearly 600 animals representing 36 species whose status in the wild is precarious. These animals form the basis for the Center's long-term breeding and research program.

The National Zoo has certain features in common with other Smithsonian public facilities and some features that are unique within the Smithsonian Institution. Through its public functions of education and recreation, entertainment in the broad sense, the Zoo seeks to enhance public awareness about biology and related subjects. The Zoo concerns itself with all aspects of animal and plant life, both terrestrial and aquatic, small and large, past and present.

Since its first appearance, humankind has been an increasing influence on life on earth, and biological history is an increasing concern of the Zoo as it attempts to represent the whole of life on earth, plant and animal, in all its complexity and glory. To this end, the Zoo will transform the animal-only zoological park into a biological park that will highlight the relationships of animals and plants. By displaying the spectacle and beauty of life on earth, the BioPark will instill in visitors a concern for the future of all life in all its forms. This holistic approach will combine living exhibits of plants and animals with museum-type exhibits of structures, such as skeletons and fossils, and will make correlations with other Smithsonian entities.

Living Exhibits - The National Zoo exhibits animals primarily to excite Zoo visitors about biology and the natural world. It is rapidly shifting its focus from animal exhibits to BioPark themes, shedding traditional divisions between plants and animals, aquatic and terrestrial life, vertebrates and invertebrates, and even science and art. Museum exhibits have long put living things in separate aquariums, botanical gardens, and natural history and art museums. The BioPark emphasis displays the interrelation between plants and animals, living and extinct organisms, water and land, form and function. The idea of the BioPark also extends beyond formal exhibits to encompass such areas as butterfly gardens, which grow food plants to attract species of a local butterfly. Colorful graphics and labels identify the butterflies and the plants on which they feed. The BioPark will also show the effect of human activities on nature, including domestication, farming, hunting, and art.

In FY 1989, the Zoo opened a new 700-square-foot bat exhibit, located on the ground floor of the Lion-Tiger Exhibit. Visitors enter a cave where 160 bats of two species fly actively back and forth and roost on dead tree limbs and in a hollow tree. A pool and waterfall further enhance the exhibit.

The newly renovated Wetlands Exhibit, located in front of the Bird House, also opened in FY 1989. This naturalistic, thoughtful setting, surrounded by aquatic plants, will come alive each spring with the elaborate courtship rituals of ducks, geese, and swans.

Dorcas gazelles, hammerhead bats, spider monkeys, piping guans, emerald tree boas, and water dragons were among the nearly one thousand births and hatchings at the Zoo in 1989. Included in this total are some endangered species, such as Cuban crocodiles, Guam rails, Bali mynahs, and golden lion tamarins. Two new endangered species acquired by the Zoo, the Micronesian kingfisher and Sumatran tiger, are significant additions to the Zoo's exhibit program.

Animal Management - Two veterinary hospitals, one at Rock Creek and one at Front Royal, serve as the backbone of the medical and research programs of the Zoo's Department of Animal Health (DAH) and Department of Pathology (DP). The good health of the collection results from an aggressive approach and strong preventive medical program, with laboratory and pathology support from DP for all medical programs. The current medical case load consists of approximately 3,300 cases each year with about 525 animals hospitalized and 300 animals quarantined before joining the collection.

Some recurring medical problems become projects for the Zoo's applied clinical research program. These projects include a study of the epidemiology, treatment, and control of Shigellosis in primates, especially the Zoo's gibbons. Shigella infections, common in primates, cause morbidity and death and are a public health concern for the keepers. This study will use a new generation of antibiotic to

eliminate the carrier state of the disease, followed by a vaccine to prevent its recurrence. The results of this study will help protect other primate collections and help explain how the disease affects humans. While studying the effect of the antibiotic, researchers will measure its level in the animals to ensure an adequate, but nontoxic dose. Zoo researchers are running this antibiotic study concurrently with similar studies on the Zoo's patient populations including this year, free-living elephants in Africa and cuttlefish housed in the new invertebrate facility.

Cystinuria, complicated with kidney and bladder stones, is an ongoing problem among the Zoo's maned wolf population. Researchers have tried surgical treatment for the stones with only short-term results. Studies assess whether diet is one method of control. Other studies assess whether new drug treatments for stone formation in humans can apply to wolves. This drug may help in treating the endangered maned wolves, 85 percent of which test positive for cystinuria.

The Zoo's studies of anesthesia continue, both in the collection animals at NZP and in free-living animals in Africa, Australia, and Brazil. Safe anesthesia is mandatory for medical and surgical care and aids in field studies of free-living species. The Zoo also uses applied clinical research on free-living specimens to better understand the medical problems of captive populations. For example, some scientists question the reliability of intradermal tuberculin in diagnosing tuberculosis (TB) in elephants. The staff tested free-living elephants in Africa, where TB was not reported, and found that some animals reacted positively to the TB test. This result has led to further study of blood and tissue samples. That will explain the causes of the apparent false-positive reactions, a continuing enigma in many nondomestic hoofstock.

Other problems the staff is studying include gallstones and ovarian cysts in captive golden lion tamarins, a species the Zoo is reintroducing to wild populations in Brazil. One question concerns whether the reintroduction of this species of tamarin can endanger the free-living species. To answer the question, the staff will conduct a field study in Brazil using radiographs and ultrasound to evaluate the wild population for gallstones and ovarian cysts. Once researchers determine the status of these wild tamarins, then they can make decisions about which animals to release. DAH is also diagnosing and evaluating potential genetic defects, such as diaphragmatic hernias.

During FY 1989, DAH developed and organized a national workshop on "Research Priorities for Single Species Conservation Biology," cosponsored with the National Science Foundation. For four days Zoo staff and renowned experts in reproduction, natural populations and release biology, and small population biology exchanged insights. One outcome was a guide that identifies specific research areas of conservation biology worth Federal and private research support.

DAH's Reproductive Physiology Programs (RPP) continued their pioneering role in applying biotechniques to studying and conserving endangered species. Little data on breeding wild animals exists, and scientists have debated the best reproductive techniques for enhancing breeding and maintaining genetic diversity in wild animal stock. A sound understanding of reproductive processes is necessary for breed enhancing of any species and, by taking a physiological research approach, scientists have achieved the widely known improvements in the domestic livestock industry and the many clinical successes in overcoming human infertility.

The objectives of RPP are to:

- study the breeding process in some captive and free-living wildlife species;
- use biotechnology to assess and combat infertility;
- consider the application of artificial breeding of captive endangered species;
- create an international genetic resource to maintain biodiversity.

In 1989, RPP continued research efforts in endocrinology, embryology, fertility, and sperm/embryo freezing. Major research grants from the National Institutes of Health, the Scholarly Studies program of the Smithsonian Institution, the U.S. Fish and Wildlife Service, and the National Science Foundation expanded these programs.

The Endocrine Research Laboratory (ERL) continued to make great strides in the noninvasive monitoring of hormones in wildlife species. Zoo staff completed projects to document the breeding cycle of the endangered Eld's deer, Pere David's deer, and Przewalski's horse. Researchers refined techniques for diagnosing pregnancy and gestation in these species, thereby enhancing species recovery plans. The staff developed new laboratory techniques to study, for the first time, the unique endocrine system of the free-living dwarf mongoose in the Serengeti National Park. This species lives in packs in which only one adult female actively reproduces. Zoo researchers speculate that these studies will reveal how dominance behavior affects breeding success.

ERL applied urinary hormone technology for the first time in 1989 to the seasonally breeding male Eld's deer. Little is known about the endocrine systems of male wildlife species, and the Zoo hopes that this research will lead to the regulation of testis function, thereby improving the breeding chances of subfertile males. The past year also brought a new research fellow to the ERL, an expert in monitoring hormonal levels in fecal material. This technique gives another noninvasive way to assess breeding status in nervous wildlife species. A long-term project in the Mikumi National Park, Tanzania, uses this technique to study the dominance behavior in free-living baboons.

ERL continues its leadership in studying sperm and egg interaction in carnivores. Researchers completed many basic projects to refine laboratory techniques for in vitro fertilization (IVF) in domestic and rare species of cats. Staff placed particular emphasis on the effect of abnormal sperm, common in many endangered species, on the IVF process. New results showed that IVF could produce embryos of a highly endangered subspecies, such as the Florida panther, even when using 99 percent abnormal sperm. These new findings provide hope that rare animals, even those severely infertile, can be bred in vitro.

The newest direction in embryology research involves taking genetic material from animals that die abruptly. Eggs can be collected directly from the ovaries of spayed mice, rats, sheep, and cattle, and RPP will apply this strategy to rare species that die abruptly in captivity. Studies in the domestic cat showed that 54 percent of collected eggs would mature in the laboratory, and 34 percent of these fertilized and developed to 16-cell-stage embryos. Pilot projects began with ovaries collected from the bobcat, tiger, leopard, and puma. Many eggs and comparable maturation rates have resulted. The Zoo has achieved in vitro fertilization with this system.

The Zoo continues to explore new methods for evaluating fertility and for artificially breeding rare species. Staff modified the in vitro fertilization system to assess fertility in some rare species. In 1989, researchers completed major studies documenting the usefulness of laboratory tests for evaluating fertility of domestic and nondomestic cat species. They also developed new techniques that could use IVF to assess the fertility of free-ranging species. Procedures using salt-stored eggs, for example, could assess the semen quality of species in the field. Two major field projects in the Kruger National Park will also improve breeding. One field project involved studying the breeding season and endocrine system of the free-living impala and cape buffalo. The other involved the response of male African elephants to a synthetic hypothalamic hormone. It will develop hormone treatments that control the unpredictable and aggressive behavior of captive bull elephants, thereby improving the safety and efficiency of captive breeding programs.

DAH has played a major role in the Zoo's black-footed ferret breeding program. Working with the Conservation and Research Center, staff monitored the breeding activity of females by examining vaginal cells to decide the best time to introduce the male, a technique that could also detect vaginal sperm. Even though all the Zoo's animals were young and sexually inexperienced, three of four females became pregnant. They produced seven offspring, five of which survive. Research in the artificial breeding of ferrets continued. Artificial insemination produced young in the Siberian ferret. Sperm that had been frozen and then thawed were deposited directly in the uterus through a laparoscope. In 1989, the same procedure successfully produced domestic kittens for the first time. This procedure holds promise in rare species of cats.

Animal Conservation and Propagation - The Conservation and Research Center plays a leading role in wildlife conservation through its programs in breeding endangered species, inter-disciplinary research, and international training. CRC provides a unique environment for long-term breeding of endangered species, including mammals such as black-footed ferrets, Przewalski's horses, Arabian oryx, Burmese brow-antlered deer, clouded leopards, maned wolves, and red pandas, and birds such as Guam rails, Micronesian kingfishers, Bali mynahs, and red-crowned and white-naped cranes. This year marked the birth of the Center's first black-footed ferrets and the arrival of six Amakihi. Although not endangered, these small Hawaiian birds are part of a cooperative program to develop breeding and husbandry techniques that can be applied to other closely related endangered species. Zoo staff members are managing many of the species at the Center under cooperative Species Survival Plans. Through these programs, the Zoo will continue its leadership in endangered species breeding and research.

Besides the research activities of the Zoo staff, CRC continues each year to serve more than 30 visiting scientists, students, and volunteers who conduct research on animals in the collection or on native flora and fauna. During the past seven years, more than 350 individuals from more than 35 developing countries have trained in Wildlife Conservation and Management, Zoo Biology and Captive Animal Management courses at the Center. The Center conducts its Wildlife Conservation and Management Training course for two months each summer and at overseas locations three times a year. This year, living quarters were extensively renovated and expanded to accommodate participants from Peru, Brazil, Ecuador, Bolivia, Guatemala, Mexico, Tanzania, Kenya, Liberia, Thailand, Indonesia, and the Philippines. One instructor recently went to Malaysia to help its wildlife department develop independent training and environmental education programs.

Over the past two years, NZP has conducted the Zoo Biology and Captive Animal Management training course for more than 120 mid-level zoo managers in Thailand, Malaysia, Brazil, and Guatemala. This program promotes conservation through the urban zoos of tropical countries and receives broad support. The Zoo has received requests for this training program from Morocco, Mexico, Argentina, Indonesia, and China.

The Zoo recently expanded conservation activities in Southeast Asia by hiring an international conservation officer to work directly with government and nongovernment organizations in Thailand, Malaysia, and Indonesia. This specialist will identify and address specific conservation training, management, and research needs. With the help of the U.S. Fish and Wildlife Service, Center staff members gave a workshop on microcomputer data management and analysis at the Bombay Natural History Society in India in early 1989. The Zoo recently received a Smithsonian Society grant to develop a worldwide electronic conservation bulletin board using microcomputers. This undertaking will enable a rapid international exchange of information on conservation and research issues among interested parties in both urban areas and remote field locations.

Research - The success of NZP programs in conservation and propagation depends largely upon the Zoo's research. The reintroduction of the golden lion tamarins to the forests of Brazil would not have been possible without sophisticated and painstaking research on the structure of the social and family life of tamarins, including their foraging and feeding behavior, diet, metabolism, and genetics. The Zoo's field ecology program in the Poco das Antas Reserve, Brazil, focuses on the mating system, social organization, and communication systems of golden lion tamarins. Studies involve the ecology of associated vertebrates and invertebrates so that scientists can predict how and why the future population might expand. Scientists in Brazil are also planning research efforts in the endangered southeastern coastal rain forest of that country. By developing two new field stations, they can compare the fauna and flora of the different habitats in this nearly destroyed region.

Long-term studies of the vertebrates of the llanos region of Venezuela continue. Researchers focus on the social interaction among troops of howler monkeys when invaded by nontroop males. These invasions often lead to infanticide in mammals, a frequent occurrence whose function is being hotly debated.

Field studies of endangered species are yielding ecological and behavioral data useful for their preservation. Studies of the interaction of kit foxes, coyotes, and red foxes in the protected Carrizo Plain of California are seeking to determine why the number of endangered kit foxes are declining and to develop strategies for their preservation. NZP scientists are also charting the restoration of degraded habitat, studying methods to encourage support for conservation by local communities, testing new techniques to help tamarins survive in the Poco das Antas Reserve, and conducting studies of rare and little known small mammals such as the unique bamboo rat.

Research at the Zoo concentrates on understanding influences on the biology and behavior of animals. One major area of interest is growth. Studies focus on the natural growth patterns of different species to determine the course of development and evolutionary basis for species differences in adult behavior. For example, scientists are conducting studies that show the interaction of inborn behavior with learned behavior. Researchers apply these studies of learning to training adults and young of zoo-born animals for survival in the wild. The Zoo also compares the play patterns of ungulate juveniles to determine if the infant antelope who follows its mother from birth differs from the one who hides during the first weeks of life.

Studies by Zoo staff members have resulted in new understanding of the growth of marine mammals. The Zoo has reference data on the milk composition and concurrent growth and development of several species of seals and sea lions. With these data, scientists can correlate growth rates with ecological and evolutionary factors. Zoo researchers studying the endangered monk seal of Hawaii are examining the fact that female seals nurse other pups besides their own. The competition among the seal pups may result in some animals not receiving enough food to live. This behavior may derive from ecological conditions, and it may be contributing to the decline of monk seals. Future studies will assess whether the degree of fostering varies in different habitats.

A major new research project at the Zoo focuses on genetics. A population genetics study will aid in the long-term viability of zoo populations of critically endangered species. NZP scientists are developing computerized demographic models and long-term breeding plans for zoo populations of tigers, Asian lions, and golden lion tamarins. The Zoo's genetics specialists give advice on many international programs for endangered species, including Bali mynahs, California condors, black-footed ferrets, and tigers.

The use of several new molecular genetics techniques still support the conclusion that the three forms of lion tamarins, though very different in appearance, are almost the same biochemically. Recent studies comparing the lion tamarins with other tamarin species suggest that genetic similarity is specific to them and that other marmoset and tamarin species have more genetic variation. The Zoo is expanding technical expertise and state-of-the-art DNA fingerprinting techniques to document the pedigrees of captive colonies.

An analysis of the genetic variability of two endangered bird species, the Guam rail and the Guam kingfisher, both extinct in the wild due to depredation by an introduced snake, will permit the choice of genetically variable individuals for pairing during a future reintroduction.

Zoo staff members are conducting important new studies on the relationship among mating systems, reproductive behavior, and genetic paternity. Studies of the behavior of purple martins suggest that the young male from this colonial breeding species is not always the father of the young for which it cares. Similar results for other species of birds and mammals suggest that researchers must reevaluate current theory concerning kin selection and the evolution of social behavior.

The Zoo continues to make major advances in the study of animal communication. The development of a new heart-rate monitoring technique in birds now allows NZP to evaluate the physiological responses of birds to potentially stressful situations, including social interactions. Initial studies have shown that when stressed, the heart rate of sparrows nearly doubles, to 1,000 beats per minute. Scientists will be able to determine whether the singing of other birds or interaction with other birds during territorial encounters results in a comparable stress level. Studies will also focus on whether the function of singing by tropical songbirds differs fundamentally from singing by temperate climate songbirds. Evidence suggests that the former use song to locate others of the same species and that the latter use song to disturb listeners and transmit distance information. Scientists also are conducting in-depth studies of vocal and long distance communications of the giant pandas and golden lion tamarins as mechanisms for promoting successful breeding and maintaining group isolation and cohesion.

Numerous projects now keep the Zoo's energetics laboratory busy. The successful application of energetic evaluation techniques to studies of mammal breeding strategies has led to an increase in research projects asking energetically related questions.

In recent years the increase in research programs, students, and research associates has strained the dispersed, outdated, and cramped facilities at the Department of Zoological Research. In mid-1988, NZP initiated extensive renovation of the Research Building. When completed, it will provide modern laboratory suites for nutrition, energetics, and video and audio analysis for the growing Department. The Zoo will have improved and enlarged animal holding and office space.

In early 1988, NZP constructed a temporary genetics laboratory in the Propagation Building to support the newly established Molecular Genetics Unit. The genetics laboratory will expand when the renovated Research Building opens in 1989.

Public Education and Information - A major unifying theme of public and educational programming during 1989 has been reflection on the first 100 years of the National Zoo and its progress during that time. A second theme stressed by educational and public information programs is the urgent need for wildlife and habitat conservation.

The Zoo seeks to inform and educate the large and diverse audience it serves through a wide range of creative programs, exhibits, and materials. The National Zoo News, a newspaper for area teachers, keeps them informed about the Zoo and its many educational offerings, ranging from multi-visit hands-on programs to single-visit programs. Teacher-training workshops represent a key component of school programs. Outreach for schools in the Washington metropolitan area includes loan kits for teachers that feature objects, books, and related curriculum materials. The emphasis in recent years has been on activity-based programs, in which students closely observe animals. A dozen such programs are available, including "Dinosaurs and Living Reptiles," a two-visit program jointly conducted with the National Museum of Natural History; "Invertebrates"; and "Zoo Animals: A Closer Look," a six-visit program for city schoolchildren and their teachers. Symposia instruct high school students in research and conservation.

With its support society, the Friends of the National Zoo, the Zoo offers adult classes in conservation, animal behavior, and exotic animal medicine. Participants completing six courses receive certificates in wildlife studies. To date, several hundred people have received certificates, and many more have enrolled in the classes.

The Zoo is emphasizing cooperation with other Smithsonian bureaus by creating two joint programs in 1989. With the National Portrait Gallery and the National Museum of Natural History, the Zoo developed and tested the innovative "Bison, Butterflies, and Naturalists," which gives junior high school students an integrated understanding of historical and contemporary problems in conservation. With the National Museum of American History, the Zoo is experimenting to find new forms of informal learning to offer general visitors to the Zoo and the Museum.

The Zoo regularly creates educational exhibits to accompany and explain new animal exhibits. In 1989 and 1990, these will include the new Australia Exhibit and major renovations of the Bat Cave, Elephant House, and Great Flight Cage. Every year the Zoo conducts a program of identification and information labels on a range of

subjects as diverse as the Zoo's collection, which change with new animals and new information about them. Other exhibits are also an integral part of the program. "A Walk through History," which draws upon the Zoo's rich photographic archives to depict its first 100 years, will be on display at sites throughout the Zoo during the Centennial year. In cooperation with the Smithsonian Institution Traveling Exhibition Service (SITES) the Zoo is creating a traveling exhibition "The Good, the Bad, and the Cuddly: Human Perceptions of, and Attitudes toward, Animals." "Zoo Ark," a traveling exhibit created by the National Zoo, continues to circulate under the auspices of SITES, conveying information about zoos and worldwide conservation programs to family audiences throughout the country.

The Zoo's Master Graphics Plan aims at renovating all forms of orientation for the public to draw attention to the Zoo's Centennial, reflect the philosophy of the BioPark, and show major physical changes, especially the redirection and improvement to Olmsted Walk. As the first step, Zoo staff created an entirely new map brochure for all visitors.

Both in Washington, D.C. and across the United States, people share in the achievements of the Zoo through print, television, film, symposia and lectures, and cultural events. Special programs during 1989 highlighted the Zoo's Centennial, especially the opening ceremony on March 2, 1989, which featured First Lady Barbara Bush. In June an unprecedented all-day Community Open House presented behind-the-scenes work at the Zoo, previewed the Smithsonian-Kodak home video on the Zoo, and offered live music and other performances.

Continuing its successful ten-year-old program of public symposia on important zoo-related subjects, the Zoo presented "The History and Future of Zoos." The regular program of lectures sponsored by the Zoo was extended and a special series sponsored by the Smithsonian Resident Associate Program. The Zoo's Centennial was featured in both Smithsonian magazine and in a one-hour program aired on "Smithsonian World."

Through these and many other programs, news and feature stories, publications, and other activities, the Zoo directly focused public attention on issues important to biology, wildlife, and conservation and engaged new audiences to increase public understanding of these topics. In addition, Sunset Serenades, a lively and diverse series of musical performances at the winter holidays and on summer evenings, continued to reach out to new audiences and acquaint them with the Zoo and its missions.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the National Zoological Park requests an increase of 14 workyears and \$1,000,000 to support existing programs (11 workyears and \$460,000); expand its scientific and research equipment purchase program (\$400,000); establish a Genetic Resource Bank (2 workyears and \$90,000); and support the Conservation Training Program (1 workyear and \$50,000).

Support of Existing Programs (11 workyears and \$460,000) - In 1974, the Zoo began an energetic program of major construction and improvement known as the NZP Master Plan. Since then the Zoo has invested more than \$53.0 million in new and renovated exhibits and support facilities. As the construction program continues, it transforms the zoological park into a biological park stressing the diversity and interdependence of plants and animals. The new national BioPark will combine elements of existing zoos, aquariums, natural history museums, botanical gardens, arboretums and ethnological/anthropological museums to create a holistic form of bioexhibitions portraying life in all its splendor. However, the modern facilities and the programs

the Zoo has scheduled will be of little value without the support of staff and funds necessary to operate the facilities.

Many of the recently completed construction and improvement projects, as well as the Zoo's scheduled Amazonia Exhibit and other aquatic exhibits, require a high degree of water filtration and mechanical support systems. The Amazonia Exhibit alone will require filtering 100,000 gallons of water per hour, plus an air-cooled chiller unit with 100-ton capacity that will need constant attention. For the health and safety of the plants and animals in these exhibit areas, the Zoo requests funds for a water quality specialist (1 workyear and \$33,000), a utility systems repair operator (1 workyear and \$33,000) and a general maintenance person (1 workyear and \$21,000).

The remaining workyears in this request will directly support the conversion from the traditional zoological park to a biological park. The inclusion of the new areas of exhibit emphasis will require NZP to hire persons for positions that are not found in the traditional zoological park. The FY 1991 request will fund a biologist (1 workyear and \$46,000), three museum technicians (3 workyears and \$72,000), and two tropical gardeners (2 workyears and \$60,000). To support the expansion of the Zoo's public programs revolving around the conversion to a BioPark, the Zoo also requests funds for a public program specialist (1 workyear and \$32,000) and a museum aide (1 workyear and \$21,000). The additional \$142,000 required to support this program area will buy new exhibit materials (\$60,000), aquatic and tropical plants (\$50,000), animals for new and expanded exhibits (\$20,000) and fund travel in support of NZP's acquisitions program (\$12,000).

To move from the traditional cage-based, animal-oriented zoo to a more accurate reflection of the unity of life on earth will require sophisticated new programs. The requested resources will continue to move the Zoo in this direction.

Scientific and Research Equipment Purchase Program (\$400,000) - The Zoo is a leading international center for animal exhibition, biological and veterinary research, conservation, and public education. To serve these functions, it must have a sound financial base for the purchase of laboratory equipment. Functional equipment will ensure continued success of the Zoo's endangered species program, its medical program, and its cooperative efforts with other national and international research organizations, including other zoos.

In the last few years, the Zoo has completed surveys of its equipment at Rock Creek and Front Royal, Virginia. These reviews indicate that the average life of equipment ranges from six to 13 years. Much of the Zoo's research equipment is obsolete because of recent technological developments. The productivity of the staff, especially new members trained in the use of modern equipment, has decreased because of the condition of the equipment. The alternative of sending samples to commercial laboratories for analysis is not always an appropriate choice or the best solution. The longer the samples are in transit, the greater the chance of damage. Moreover, commercial laboratories establish their own priorities regardless of customers' requirements. On-site laboratory analysis enables quicker turnaround and more versatility in testing.

Congress appropriated funds in FY 1987 to enable the Zoo to purchase equipment for the new veterinary hospital. These funds remained in the operating base and provided additional equipment for the hospital. The Zoo has redirected limited funds on a case-by-case basis to purchase some equipment items. These redirections have

helped. However, additional funds are now necessary to ensure a regular, cyclical replacement plan for important pieces of Zoo equipment.

Most departments engaged in activities crucial to the health of the collection are using equipment ten years old or more. Such equipment often does not have the capabilities that today's research requires. In some cases, departments must resort to repairing equipment they ought to replace. The requested funding will permit the Zoo to purchase such equipment as a gas chromatograph (\$27,000); a satellite telemetry system (\$16,000); a high-performance refrigerated centrifuge (\$16,500); an automatic gamma counter (\$23,500); and an image analysis system (\$15,500). A stereo dissecting microscope currently in use is 15 years old. Though it is still functional, its use is limited. Newer microscopes have additional capabilities, including still camera and videotaping attachments that enable researchers to store tapes for later review and study purposes. A new milli-q-water purifier, which costs \$7,000, detoxifies water and removes trace elements, making water pure for storing and examining tissue samples.

With the expansion of the research programs and changing technological advances in scientific equipment, the Zoo requires additional funding to permit regular, cyclical replacement of Zoo equipment. The request for FY 1991 will ensure that Zoo staff have equipment that is crucial to monitor and maintain the health of the live collection and to support present research needs.

Genetic Resource Bank (2 workyears and \$90,000) - During the past decade, concern about the loss of species and genetic diversity in wild taxa has increased. Gamete and embryo cryopreservation will be instrumental in assisting conservation and management of mammals, yet no organized effort exists, either in the United States or elsewhere, to sample, evaluate, cryopreserve, maintain and use germ plasm from animals other than common, domestic species.

The proposed Genetic Resource Bank of the Zoo will facilitate international efforts to preserve rare and threatened sources of biodiversity in animal species. The Bank will:

- study low-temperature biology and storage of viable biological cells, especially sperm and embryos;
- develop and apply new concepts in cryobiology and techniques for controlled breeding to conserve and propagate rare and endangered animals;
- train national and international scientists in the application of cryobiological techniques.

The Zoo has two new state-of-the-art veterinary hospitals and a highly skilled team of veterinarians and scientists. NZP's Reproductive Physiology Program has modern breeding expertise in the necessary areas of embryology, andrology, endocrinology, and genetics. A Genetic Resource Bank, integrated with these special disciplines, will provide a unique resource that will expand existing capabilities and provide the critical technology necessary to maintain biodiversity using cryopreserved gametes and embryos.

For FY 1991, funds will provide a cryobiologist (1 workyear and \$64,000) to direct the program, coordinating research with existing staff within and across bureaus. The cryobiologist will formulate guidelines and strategies for establishing

an international bank of germ plasm for propagating endangered species and ensuring conservation of genetic diversity. Successful freeze-storage and recovery of sperm, ova, and embryos often depends on species-specific requirements, making technology development labor intensive. A laboratory technician (1 workyear and \$26,000) will conduct daily routine experiments and assist in the major task of record keeping. As the program expands, the Zoo will require a second technician in FY 1992.

NZP already has provided important leadership in applying advanced molecular and reproductive techniques to the study and propagation of rare species. Support for a Genetic Resource Bank will ensure that the Smithsonian remains in the forefront of research in this area. Initiating this new program at the Zoo will permit a controlling influence on systems and materials critical to world conservation of biodiversity.

Conservation Training Program (1 workyear and \$50,000) - The Zoo's conservation programs in captive propagation of endangered species, interdisciplinary research, and international training are unique among zoological institutions and have won international recognition. During the 1991-95 planning period, the Conservation and Research Center will strengthen these programs by improving and expanding physical facilities for animal breeding and research and by expanding its ongoing international training courses in Wildlife Conservation and Management.

Over the next few years, CRC will initiate training programs in two African countries, Malawi and Ghana and institutionalize programs in three Southeast Asian countries, Thailand, Malaysia, and Indonesia as well as in China and Venezuela. In FY 1991, CRC will publish a new Zoo Biology and Captive Animal Management manual. This manual will provide urban zoos in tropical developing countries with training in current veterinary practices, breeding management, exhibitry, and other practical knowledge, as well as public conservation education. The course has succeeded in expanding the international network of zoos participating in endangered species propagation, and CRC has received numerous requests for it from other countries. The Center's overseas activities will expand over the next five years with the placement of two additional conservation officers in Africa and Latin America.

For FY 1991, the Zoo requests funds for a conservation training officer (1 workyear and \$32,000) to support the Wildlife Conservation and Management training course as an instructor in Africa and to prepare and track funding proposals. Additional monies will fund travel and support requirements (\$18,000).

Through the extensive international network forged through its research and training programs, the Center can play an important role in assisting developing countries to plan and implement conservation initiatives. These programs allow the National Zoo to strengthen international ties and actively promote wildlife and environmental research and conservation in threatened tropical regions. The world will lose many conservation and research opportunities if these programs are not continued and expanded.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds come from a variety of sources, including allotments and fees for services and general use of the facilities by Trust-fund units or outside organizations. The Zoo uses these funds to support and maintain its facilities, purchase plants and animals for the collection,

support a number of three-year assistantship programs, purchase scientific and research equipment, and meet the salary and support costs of the director.

Restricted Funds - Gifts and foundation grants continue to support specific research projects, programs, and the acquisition of animals for exhibit purposes. The Zoo receives outside funding from several foundations and organizations to support the training of zoo professionals from developing nations in wildlife management and zoo management. The Zoo's reintroduction programs continue to receive support from various organizations. On a limited basis, NZP receives funding, usually from private donors, for the purchase of animals for the collection.

Government Grants and Contracts - The Zoo has received funding from various government agencies and departments to support specific research projects. The research staff received a grant from the National Science Foundation (NSF) to study endocrine function in the free-living dwarf mongoose of the Serengeti National Park. A second grant from NSF funded a conference on Research Priorities for Single Species Conservation Biology. Zoo researchers are conducting a study of in vitro fertilization in domestic and nondomestic cat species with a grant from the National Institutes of Child Health and Human Development. A five-year grant from the National Institutes of Health, Division of Research Resources, supports a study on fertility and artificial breeding techniques in rare cats. The research staff is conducting a study of artificial breeding techniques in domestic ferrets with a grant from the U.S. Fish and Wildlife Service. This work with domestic ferrets is a first step to a major research project for the endangered black-footed ferret.

SMITHSONIAN INSTITUTION ARCHIVES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	15	600	6	215	-	-	-	-	-	-
FY 1990 Estimate	15	621	6	215	-	-	-	-	-	-
FY 1991 Estimate	21	861	6	215	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Institution Archives (SIA) is the official repository of Smithsonian Institution records. SIA acquires records of the Institution's work and documentation of American science, technology, and museums and keeps them as evidence of the Smithsonian's past for future research.

Located in the Arts and Industries Building, the facility is convenient to principal users. A records center on North Capitol Street holds inactive records awaiting disposition. Remote storage for records that exceed central storage limits is in leased space in Springfield, Virginia. Modification of an existing building at the Conservation Research Center, Front Royal, Virginia is underway for security storage of documents. Comprehensive archives facilities convenient to the Mall are also planned as part of a long-term solution to SIA's space needs.

For FY 1991, the Smithsonian Institution Archives requests an increase of 6 workyears and \$240,000 to begin a ten-year program to reinforce its infrastructure.

PROGRAM - The Smithsonian Institution Archives acquires, keeps, and services the Institution's historical records. Archives staff members locate documents to assist scholarly studies, and advise the Secretary and principal officers on archives and records management. They coordinate and advise archives work of bureau-based documentation centers throughout the Institution. They also provide advice to other museum archives around the country.

In FY 1989, the Archives began a multi-stage project to conserve deteriorating original architectural drawings of Smithsonian Buildings designated as national historic sites. SIA published a general guide to archival, manuscript, and special collections resources throughout the Institution. Other publications included guides to the records of the Office of the Secretary (Samuel P. Langley) and to animal-related records at the National Zoological Park. SIA copied 3,500 nitrate negatives onto safety film and destroyed the negatives. Another 8,600 negatives in temporary remote storage await copying.

Statistical Summary of SIA Activity

	FY 1987	FY 1988	FY 1989*
Total Holdings at Year-end (cubic feet)	13,441	14,393	15,300
Accessions Added (cubic feet)	1,334	1,070	900
Reference Inquiries	1,538	1,610	1,600
Items Provided to Researchers	5,552	6,148	6,500
Pages of Copy Provided Researchers	27,644	28,431	28,500

* FY 1989 figures are estimated as of June 30, 1989.

EXPLANATION OF PROGRAM INCREASE:

Smithsonian Archives Infrastructure (6 workyears and \$240,000) - The FY 1991 request is the first step in SIA's ten-year development plan. The plan seeks to maintain current services through support of SIA's infrastructure. It aims to make future archives adequate for future research and to maintain the quality and quantity of services to users in proportion to Institutional growth.

As the Smithsonian Institution becomes a larger and more diverse resource for the nation, the Smithsonian Institution Archives must grow accordingly. With each year, accessions become more voluminous, administratively more complex, and technically more sophisticated. Storage of records requires additional space. For the short term, SIA rents storage space, but long-range planning includes archival facilities near the Mall. Many records require rudimentary preventive maintenance as well as preservation work. Processing the greatly increased volume of records on hand and added annually is another pressing problem. Additional staff and specialized supplies are necessary to perform these functions.

This first step in its ten-year plan enables SIA to:

- hire four archives technicians, one archivist, and a clerk-typist to do records surveys, process and preserve records, and provide research service;
- purchase shelving and map cases to store records;
- purchase two large-memory-capacity personal computers to develop databases of archives management information;
- participate in a national bibliographic utility such as the Research Libraries Information Network (RLIN).

This infrastructure investment will permit the SIA to keep pace with the growth of the Institution. It ensures that SIA will possess the ability to deliver archival services at levels of essential quality and quantity using modern technology promptly and effectively.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Provided by annual allotment, these funds cover the salaries, benefits, and support costs for an archivist and an archives technician. They also support a temporary archives specialist and three program assistants engaged in a photographic collections project and the production of a guide to those collections.

SMITHSONIAN INSTITUTION LIBRARIES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	101	5,161	10	390	-	3	-	6	-	-
FY 1990 Estimate	102	5,338	11	417	-	2	-	13	-	-
FY 1991 Estimate	111	5,919	11	417	-	1	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Institution Libraries (SIL) serves the Institution and the public by providing information resources and services to support Smithsonian research, curatorial, publication, and administrative activities and participation in the creation of a national bibliographic data base and programs for publications, exhibitions, and interlibrary loans. Its collections of more than one million volumes, including more than 20,000 journals, are available to Smithsonian and outside scholars through a system of 14 branch libraries. SIL purchases books for all Smithsonian organizations and coordinates requests for automated information sources. These services help to avoid duplication of library-related procedures and expenses within the Institution.

For FY 1991, the Smithsonian Institution Libraries requests 9 workyears and \$581,000 to support brittle book preservation (5 workyears and \$185,000); journal acquisitions (\$221,000); service enhancement (2 workyears and \$100,000); collections evaluation (1 workyear and \$37,000); and an additional librarian position for the NMNH branch library (1 workyear and \$38,000).

PROGRAM - The Smithsonian Institution Libraries provides both centralized and decentralized services. The central collections support multi-disciplinary research and emphasize interdisciplinary topics such as management, fundraising, conservation, and museology. The specialized collections in the branch libraries are outstanding in natural history, American ethnology and culture, tropical biology, African art, decorative arts and design, astrophysics, the history of science and technology, aeronautics and astronautics, conservation research, and horticulture. SIL's collections include approximately 35,000 rare books, primarily in science, technology, applied art, aerospace, and natural history. The largest of these rare book collections is the Dibner Library, which has 19,000 volumes and manuscripts on the history of science and technology.

The Libraries carries out its responsibilities through three operational divisions: the Research Services Division, charged with direct reference assistance to Smithsonian researchers; the Collections Management Division, responsible for the selection, acquisition, and preservation of library collections; and the Automated

Systems Division, which manages SIL bibliographic data bases, catalogues and maintains inventory control of SIL collections, and coordinates all automation of SIL operations. By centralizing acquisitions and cataloguing, preservation and conservation activities, administrative services, and interdisciplinary reference/information services, SIL has achieved system and cost efficiencies.

Research Services - The Research Services Division of the Smithsonian Institution Libraries provides direct library services to its users. SIL collections and services are accessible to users through 14 branch libraries and a service annex. SIL houses the collections on and off the Mall, including Cambridge, Massachusetts, New York City, and Panama. SIL allocates staff to branches based primarily on the size of the collections and the extent to which Smithsonian staff, visiting scholars and researchers, and the general public use each library. All branches offer sophisticated subject and information science expertise to provide users with the information they require.

In FY 1989, the Research Services Division introduced a revised form for reporting statistics, correcting anomalies in the collection of data. For example, previous reporting methods counted intralibrary loans twice: first by the branch that loaned a volume to another branch, and second by the latter branch when the volume circulated to a borrower. Since a single volume is involved, that now counts as only one transaction. As a result, for the first time, the following statistics reflect actual transactions. In FY 1989, SIL circulated 61,044 items to borrowers both within and outside the Institution. Locating articles and monographs not held by SIL requires searching both electronic data bases and printed indexes and catalogues. Once located, SIL requests the item on loan either through a national computer network or via the U.S. mails. Upon receipt, SIL then delivers the item to the user. Increasingly, SIL staff rely on commercial document delivery services to make information from professional journals more rapidly available.

In addition to borrowing items for Smithsonian researchers, SIL lends items to other libraries nationwide. Of the 61,044 circulation transactions in FY 1989 described above, 6,032 represent loans of volumes and photocopies from SIL collections to users in other libraries via interlibrary loan.

The Research Services staff also supports research by preparing lists of new acquisitions and bibliographies on specific topics. Bibliographies direct users to new sources of information and are particularly useful in responding to frequently asked questions or for topics of general interest. SIL distributes several hundred bibliographies annually in response to inquiries, especially from the branches at the National Museum of African Art, the National Zoological Park, the Office of Museum Programs, and the Office of Horticulture. Some of these bibliographies, as well as acquisition lists prepared by these and other branches, are in such demand that SIL regularly sends them to other libraries both in the United States and abroad as well as to individual scholars and interested members of the public.

Reference staff assist researchers daily. In FY 1989, staff members responded to 57,745 reference questions. These ranged from straightforward requests for names, dates, and places to complex questions requiring several hours, if not days, of investigation to answer. To find the information requested, the staff uses a wide variety of reference tools, including standard published reference works and electronic data bases.

The Research Services Division is also responsible for housing and maintaining the collections. In FY 1989, SIL moved the collections of the Museum Reference Center to a new location where they could be more logically arranged with better space provided for readers. Concurrently, a contract employee spent the year reviewing and improving the organization of the vertical files, which constitute the Center's most important reference sources. SIL added new ranges of shelving at the National Zoological Park and at Central Reference and Loan Services to relieve crowding and provide room for expansion of the collections. SIL shifted the entire collection at the Museum Support Center to accommodate the large amount of material returned from the retrospective conversion project. Similarly, retrospective conversion of the Mollusks collection in the National Museum of Natural History branch library entailed rearrangement of the entire collection into the Library of Congress classification order. Support services for the collections housed at Smithsonian Institution Libraries Service Annex, located at 1111 North Capitol Street, continued in order to improve access to those materials.

The Division expanded its responsibilities in FY 1989 to include the Anacostia Museum and the Naturalist Center in the National Museum of Natural History.

Collections Management - Staff of the Collections Management Division select, acquire, preserve, and deaccession all library materials that form the SIL collections, which now contain more than 1,052,000 volumes. In early 1988, the Institution approved the revision of SIL's Collections Management Policies, which serves as a guide for collections acquisition, control, maintenance, and deaccession.

The spiraling cost of serials subscriptions forced SIL in FY 1988 and 1989 to cancel \$35,000 worth of subscriptions. Inflation is particularly acute in foreign journals because of the weakness of the dollar abroad and the rise in rates charged to North American subscribers. For FY 1989, the cost of journal renewals increased by an additional 10 percent. Consequently, SIL is unable to place new subscriptions for journals supporting new areas of Smithsonian research, such as molecular biology.

In February 1988, SIL hired a preservation specialist to initiate, establish, and administer preservation policies and procedures to enhance SIL's ability to preserve its non-rare materials. A 1986 preservation survey revealed that nearly one-third of the collections housed outside rare book facilities are too brittle to withstand continued use. SIL has found volumes published between 1870 and 1930 at particular risk, with more than 90 percent of them severely deteriorated. As a first step, SIL contracted with a commercial micropublisher to film a 2,000-volume collection of publications from international expositions held between 1834 and 1915. The publisher completed the first unit of 50 reels of film in May 1989. SIL will also produce an illustrated guide to accompany the microform collection.

Since June 1988, SIL has administered the Smithsonian International Exchange Service (SIES), which assists nonprofit institutions located in the United States. The organization sends preaddressed educational materials to interested foreign institutions, often on an exchange basis. In FY 1988, the service transmitted 60,569 packages to foreign addresses and 30,012 packages to U.S. institutions (more than 150,500 pounds of mail). SIES is part of SIL's Acquisitions Services, which separately maintains an active exchange program with nearly 3,900 partners worldwide. In March 1989, the SIES staff began to use automated mailing equipment, which has streamlined mail-processing routines. The new equipment also provides reports on users and shipments. SIES ships materials to and/or receives materials from 198 countries.

Automated Systems - SIL uses electronic technology for most of its internal library operations and for resource sharing and communication with other libraries.

Since 1974, SIL has participated in the Online Computer Library Center (OCLC), a national bibliographic utility, with almost 10,000 member libraries and a data base approaching 20 million records. SIL uses OCLC for creating and sharing records of its collections and for on-line interlibrary loans.

The Institution's Bibliographic Information System (SIBIS), installed in 1984, is the major mechanism for most SIL functions. It provides an on-line system with a central bibliographic data base. Electronic processing and machine-readable files that SIL can update and access from decentralized locations have replaced manual processes and files.

For the past eight years, SIL has conducted a program to convert its manual catalogues to machine-readable format. The converted records, which conform to the highest national standards, form the SIL on-line catalogue. Through sophisticated search keys, such as key word searching, SIL makes collections accessible from any location within the Institution. SIL has completed the basic conversion of standard manual files, with more than 402,300 records added to the data base. The program now concentrates on upgrading and converting partial and substandard records. SIL will also continue to bar code each volume represented in the on-line catalogue to allow electronic identification and circulation control.

The SIBIS acquisitions module is for on-line requests, processing of orders, account maintenance, interface with accounting, and on-line access to order information. The system tracks ordered items for expected delivery date and automatically generates a claim notice for overdue items. In FY 1989, SIL also began to create SIBIS records for serial titles received as gifts or exchanges.

SIL continued to implement the SIBIS automated circulation system by installing it in the National Zoological Park branch library and Central Reference and Loan Services. The automated system will track the location and status of items in SIL collections. It also will improve accountability and security and provide more accurate data about the use of the collections.

In FY 1989, SIL installed upgraded software for the GEAC 9000 Bibliographic Processing System (BPS), which will enhance the on-line cataloguing capabilities and provide on-line authority control. Staff have received training and will test all aspects of the cataloguing module.

SIL also installed communications software with the capability for four users simultaneously dialing out to external networks and bibliographic utilities. SIL also installed Word Perfect Office software, which includes on-line calendar, scheduler, and notebook features.

During FY 1989, SIL catalogued 17,500 rare, non-rare, trade literature, gift and older, uncatalogued items, both in-house and by contract. These records were added to both the SIBIS on-line catalogue and to the OCLC data base which makes them accessible to researchers nationally.

Outreach - In FY 1989, SIL continued its commitment to national and international responsibilities with its presentation of exhibitions, a lecture, and translated publications. On November 2, 1988, SIL presented a public lecture by Paul Vassallo,

Director of the Washington Research Library Consortium, on the consortium's plans to build a Super-Library in the metropolitan area. SIL's exhibition "Marbled Papers in Books" will continue through December 1989. In July 1989, SIL opened "Stratigraphy's Golden Age: Murchison and His Silurian System," an exhibition presented in conjunction with the meeting of the 28th International Geological Congress. SIL published an illustrated brochure, and the exhibition opened with a reception cosponsored with the History of Earth Sciences Society.

With funding from the Special Foreign Currency Program of the Institution, SIL administers the Science Information Program for Translations. This program provides scholars with English translations of scholarly monographs on topics in the natural sciences and technological history originally published in other languages. SIL catalogues the translations in a national bibliographic data base, distributes gratis copies to 180 libraries internationally, and registers the published translations with the National Technical Information Service (NTIS) to ensure their wide and continued availability to scholars. Currently SIL is administering the final stages of editing and production for 18 edited translations. The four works published this year through this program include: Keys to the Insects of the European Part of the U.S.S.R., vol. 5, p. 2; Fauna of the U.S.S.R., Lepidoptera, vol. 4, no. 5 (Clothes Moths/Tineidae) (orig. pub. Leningrad, 1975); Lepidopterous Fauna of the U.S.S.R. and Adjacent Countries (orig. pub. Leningrad, 1973); and Ground Beetles of Fennoscandia, vol. 2 (orig. pub. Goteborg, Sweden, 1945). One new order was placed this year, and another 12 books are currently in India and Pakistan for translation.

Facilities - In FY 1989, SIL completed its seven-phase renovation of central administration, central processing, the National Museum of Natural History branch library and Central Reference and Loan Services. The renovation, begun in FY 1982, allows the SIL to make the best use of existing space in the Natural History Building to house the equipment, tools, and increased staff needed for highly sophisticated technical processing and library service. At the Smithsonian Environmental Research Center, SIL relocated to a separate library space with adequate lighting, shelving, and environmental control. The Museum Reference Center moved to new quarters as a result of reorganization within the Office of Museum Programs. Its new location provides additional shelving space for materials and a more rational design of reader and staff areas. The Anthropology Library received additional space as a result of changes within the department as did the Mollusks location. Finally, the Institution has redesigned the Dibner Library as part of the National Museum of American History mezzanine construction. The Dibner will eventually expand to a new exhibition gallery in the public area.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Smithsonian Institution Libraries requests 9 workyears and \$581,000 to support: brittle book preservation (5 workyears and \$185,000); journal acquisitions (\$221,000); service enhancement (2 workyears and \$100,000); collections evaluation (1 workyear and \$37,000); and an additional librarian position for the NMNH branch library (1 workyear and \$38,000).

Brittle Books Preservation (5 workyears and \$185,000) - The Smithsonian's object collections are both supported and complemented by documentary research resources. These resources include books, serial publications, and other library materials, carefully selected to form SIL subject collections of growing national significance in many areas of scientific and historical research. In addition to Smithsonian staff and fellows, students, volunteers, and members of the public use SIL book collections heavily. A 1986 survey revealed that at least 30 percent of the SIL collection, or 300,000 volumes, are brittle. A preservation program for SIL's brittle books will

ensure that their contents will remain available for future use by both Smithsonian staff and researchers throughout the United States.

SIL will concentrate on books relating to natural history and the history of science and technology, for which SIL is a known national repository. SIL proposes to identify systematically and review each brittle volume in its collection. First, staff will determine whether the volumes are preserved elsewhere in an accessible form, such as a reprint or microform. SIL will then purchase a replacement, repair the volume, or preserve it through microfilming or photocopying. SIL's book conservation laboratory will undertake more expensive restoration work on volumes that have intrinsic value or features such as color illustrations, that mandate retention in the original. SIL estimates that, with five positions, it can identify and review annually approximately 6,000 of the 300,000 volumes that are brittle.

SIL will hire a professional librarian and four conservation technicians to carry out the brittle book program. As this staff is critical to ensure identification, selection, and quality control, SIL cannot contract out for these services. SIL will also purchase equipment to access national preservation data bases and to carry out quality-control procedures for vendor-produced microfilm. The balance of the funds requested will cover the expenses of vendor contracts, supplies, and replacement copies.

The SIL program will have a unique place in the national preservation planning efforts. Currently, little attention is directed to preserving materials in the sciences, and virtually none to the field of natural history. The Smithsonian, through a SIL brittle book program, can begin to fill a significant gap and make an important contribution to the national preservation effort.

Journal Acquisitions (\$221,000) - Research journals are essential to communication between Smithsonian scientists and scholars and their colleagues worldwide. Smithsonian curatorial and research staff benefit directly from support for the journal acquisitions budget. From it, SIL purchases only the most important books and journals in each subject of active Smithsonian interest. Over the years this careful selection has produced substantial research collections in such areas as natural history, anthropology, aeronautics, astrophysics, decorative arts, African art, and the history of science and technology. SIL collections attract well-known visiting scholars, fellows, researchers, and students to the Institution. The collections also benefit the wider academic community, who seek SIL resources through interlibrary loan. Maintaining strong internal collections of the most heavily used books and journals allows Smithsonian staff to work productively. Scholars can concentrate on research rather than on time-consuming searches for resources in other locations.

Yet a staggering rise in journal subscription rates has restricted SIL's ability to acquire journals essential to Smithsonian research. The average subscription price for SIL foreign and domestic journals rose from \$107 in 1985 to \$155 in 1988. At the same time, a 42 percent decline in the American dollar since 1985 further diminished SIL's purchasing power with regard to foreign subscriptions.

To cope with these extraordinary circumstances, SIL has canceled several hundred of its current journal subscriptions. It placed a moratorium on new serials subscriptions for FY 1988/FY 1989. SIL has also attempted to reduce costs by purchasing only "core" works for its collections and borrowing peripheral items from other libraries. In FY 1989, SIL staff again requested thousands of journal articles

through interlibrary loan. These requests testify to the inability of SIL to respond to many scholars' needs from its own collection. Unfortunately, a recent Association of Research Libraries survey of serials growth indicates that all major university libraries are facing the same stagnation and cutbacks that SIL endures. Materials that Smithsonian researchers need will become increasingly difficult to borrow from other libraries as their collections, too, diminish. Further, interlibrary loan relies on reciprocity. SIL is already a heavy borrower from other institutions. Additional inroads into the maintenance of SIL's collections will make it impossible to assist other institutions in any way comparable to its demands on them.

The journals in the SIL collection are expensive. Recently the American Library Association's, Library Materials Price Index Committee ranked serial prices in subject categories. Those subjects most in demand in SIL ranked among the top ten in expense, with chemistry and zoology in the top five. In addition, the Faxon Publishers' Service Bureau, which tracks subscription prices, projects that, by the beginning of FY 1990, overall journal prices will have risen by 36 percent from 1986. The Smithsonian uses many specialized research titles. Subscription rates for these increase at a greater rate, as the following examples for specific science and history journals show:

<u>JOURNAL</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>PERCENT INCREASE</u>
American Ceramic Society Bulletin	\$ 196	\$ 322	64%
American Journal of Botany	150	220	46%
American Journal of Pathology	133	180	35%
Atmospheric Research	123	265	115%
Auk	105	180	71%
Biochemie Und Physiologie Der Pflan	148	324	118%
Biosystems	164	340	107%
Canadian Entomologist	144	313	117%
Current Contents: Life Sciences	670	975	45%
Directory of On-line Data bases	175	130	34%
Ecological Abstracts	655	881	34%
Ekologia Polska	106	148	40%
Entomological Review	249	418	67%
Ethology	1,006	1,344	33%
International Journal of Mass Spectrometry	702	922	31%
Journal of Atmospheric Sciences	200	295	47%
Optics Letters	200	285	42%
Physics and Chemistry of Minerals	515	696	35%
Public Affairs Information Service	295	395	33%
Solar Physics	588	945	60%
Videodisc Monitor	125	247	97%
Zoo Biology	125	200	60%

Though subscriptions are costly to maintain, these titles remain vital to the support of the Smithsonian's fundamental research programs.

The requested increase of \$221,000 for FY 1991 will maintain SIL's core collection of journals at present levels. If the dollar remains relatively stable, the requested level of funding must continue for at least five years for SIL to regain

the purchasing power lost during the recent inflation in the journal market and depreciation of the dollar.

External circumstances have deprived the Smithsonian's scientists and curators of the research tools on which they depend. Unless SIL receives the requested increase, it must continue to cancel unique journal subscriptions and reduce the number of new scholarly journals purchased. Until now, SIL moved funds from other lines of its budget to maintain buying power. Prices continue to rise, and annual shifts of funds to meet these costs harm other library programs. Already SIL's ability to support new research programs in the Secretary's areas of emphasis, such as molecular biology and biodiversity, has decreased. Further cuts would drastically affect support of Smithsonian's long-term, ongoing research programs.

Collections Evaluation (1 workyear and \$37,000) - SIL acquires and makes available to Smithsonian staff documentation that complements object collections and supports scientific research. In more than 100 years of collecting, the Institution has amassed large numbers of books and journals in a variety of subject disciplines. The result is that SIL now serves, through interlibrary loan, a growing number of researchers outside the Institution as well as Smithsonian staff. But SIL lacks hard data about the relative quality of its collections and how they compare with other research libraries. The problem is compounded by the interdisciplinary nature of the Smithsonian's research fields and the dispersion of staff among several bureaus. A collections assessment program will enable SIL to conduct a systematic evaluation of its entire natural history collection. This study will aid SIL in better directing its acquisitions resources, strengthening its collections for use inside and outside the Institution, and establishing priorities for preservation.

The collections assessment program will have three components. First, SIL will release a senior reference librarian for one year to design the evaluation instruments and supervise data collection. Second, the Association of Research Libraries will conduct a workshop to train SIL staff in collection evaluation techniques. This training will enable staff to perform collections evaluation on other SIL collections in the future. Third, SIL will hold a symposium for Smithsonian researchers and curators working in natural history fields. The symposium will focus on the ways in which scientists access and use the literature of their fields, the types and kinds of published/unpublished materials needed for research, and the scientists' perceptions of what is available to them from SIL and other research libraries or organizations.

SIL will use the salary funds to hire temporary staff to release the senior librarian to guide the project. Remaining resources will pay for the workshop and symposium.

The dispersion of SIL collections throughout the Institution prevents staff from making qualitative judgments through normal processes. Only a systematic collections assessment program, using accepted standard evaluation techniques, can provide the data to assist SIL in making the most productive use of its limited acquisitions funds.

Service Enhancement (2 workyears and \$100,000) - The information explosion and the accompanying technological revolution have changed the nature of libraries. Today, the aim of research libraries, including SIL, is to act as effective members in an increasingly complex and extended resource-sharing network. To achieve this goal, they require a more complex infrastructure in the form of automated and human support systems.

Like its peers, SIL is heavily dependent on automated technology to provide better services. SIL librarians spend a large portion of their day performing complicated data searches to answer users' inquiries. They may access not only the holdings of every branch in the system, but those of other libraries throughout the country and abroad. Just as this technology has increased SIL external information sources, it also includes SIL as one of these sources for other libraries. Filling requests to borrow SIL's holdings requires full-time attention. To free them for these complex tasks, professional and skilled librarians must have a support staff, including contractors, to perform routine library functions. Shelf maintenance, including the identification and preparation of materials for binding, the packing and moving of collections, and one-time projects are a few examples of these functions. SIL librarians also require dependable computer equipment to complete their tasks efficiently. By FY 1991, 99 of SIL's original terminals will have reached the end of their lifespan. Some are already experiencing breakdowns, which create work stoppages.

SIL requests funds in FY 1991 to initiate an equipment replacement program and to cover the costs of two library technicians and contractors to perform routine tasks.

SIL must provide users rapid and accurate access to information. This service requires sophisticated skills in exploiting automated systems and other complex technologies. It is essential that SIL provide its librarians with effective technological and human support systems.

Librarian for NMNH Branch Library (1 workyear and \$38,000) - The National Museum of Natural History (NMNH) branch of SIL requires an additional librarian to maintain its current services. The NMNH branch library contains primary and secondary source materials related to several fields of natural history, including systematic biology, anthropology, paleontology, geology, and mineral sciences. These collections have national and international significance and are used heavily by scholars and researchers. With a current staff of six librarians, the NMNH Branch Library has found it increasingly difficult to provide the full range of library services required to support the Institution's expanding research programs.

Natural History reference librarians support the staff of NMNH and other museums who are doing research and developing exhibitions and other public programs. They provide technical assistance and advice on literature searching in fields covered by the branch library. They also prepare bibliographies and perform comprehensive information searches using both published and on-line sources.

The funds requested will enable SIL to hire an additional librarian to expand research services at the NMNH branch library.

SIL must offer the highest level of professional library service to make the collections useful to the Institution and to the wider academic community. The addition of a new librarian position at the NMNH branch library will deepen SIL's commitment to supporting research in the natural sciences.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - An allotment funds administrative salaries and related support costs including travel, training, and supplies. A program allotment supports such special events as public lectures and seminars.

Restricted Funds - Gifts and grants from individuals, foundations, endowments, organizations, and corporations provide these funds for specific purposes. These funds will support the preparation costs for a future publication on international exhibitions and provide for the purchase of rare volumes on the history of science.

MAJOR SCIENTIFIC INSTRUMENTATION

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	-	1,206	-	-	-	-	-	-	-	-
FY 1990 Estimate	-	2,176	-	-	-	-	-	-	-	-
FY 1991 Estimate	-	5,794	-	-	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The development of major scientific instrumentation is vital to enable Smithsonian scientists to remain at the forefront of their fields. Because of the magnitude of the costs and the time required to fabricate new instruments and to reconfigure existing ones, the Institution requests funding for such projects under this line-item rather than under individual bureau line-items. Since these projects will, of necessity, require long-term development and multi-year funding, the Institution also requests that funds in this line-item be available until expended.

For FY 1991, the Smithsonian requests no-year funding of \$5,794,000 to continue the design of the submillimeter telescope array (\$3,799,000) and the conversion of the Multiple Mirror Telescope (\$1,995,000). The FY 1991 request includes the following increases over the FY 1990 level of funding for Major Scientific Instrumentation: an increase of \$2,518,000 for the start of construction of the submillimeter telescope array (over the FY 1990 level of \$1,281,000); and an increase of \$1,100,000 for the conversion of the Multiple Mirror Telescope (over the FY 1990 level of \$895,000). In addition, the Institution asks for an increase in the funding for the personnel costs and rent associated with the submillimeter telescope array as one-year funding in the Smithsonian Astrophysical Observatory (SAO) line-item. However, the justification for those positions is included here because of their relationship to the Major Scientific Instrumentation request.

PROGRAM - The development of major scientific instrumentation, such as telescopes, requires research and development (R&D) over an extended period of time. Teams of Smithsonian scientists, technicians, and contractors, focused on critical telescope elements such as optics, detectors, receivers, and support structures, are engaged in these R&D efforts. To facilitate the unique extended R&D efforts that are integral to the acquisition of major scientific instrumentation, the Institution established this no-year line-item in the FY 1989 budget.

Since FY 1989, the Smithsonian has requested funding under this line-item for two projects for the Smithsonian Astrophysical Observatory:

-- the development of an array of submillimeter telescopes;

-- the conversion of the Multiple Mirror Telescope.

Both of these forefront scientific projects involve the fabrication of major new instrumentation that will take a number of years to design and complete. SAO anticipates the development of the submillimeter telescope array to continue through the mid-1990s. SAO estimates that the array will require total funding at \$32.4 million (1989) for construction on a continental site and about 25 percent more on a site in Hawaii. SAO expects to complete the conversion of the Multiple Mirror Telescope by FY 1995. SAO estimates the total cost to the Smithsonian for the conversion will be \$10.8 million (1989).

EXPLANATION OF PROGRAM INCREASE:

DESIGN AND CONSTRUCTION OF THE SUBMILLIMETER TELESCOPE ARRAY

Scientific Justification - SAO's submillimeter wavelength telescope array will make fundamental contributions to astronomy and astrophysics in several areas:

(1) For studies of star formation, the array offers the prospect of detecting and studying gas falling into very young stars and, thereby, gaining detailed knowledge of how stars are formed. With unprecedented resolution and sensitivity, the array will provide images of high-velocity gas flows from recently formed stars. These images will elucidate the mechanisms that limit the growth of a star and will help answer the fundamental question, Why is the sun the size it is? The array will map the structure and motions of the disks that eventually contract into stars. Scientists will then be able to study the way in which these factors cause multiple star systems and planets to form.

(2) Use of the array will generate new information about galaxies. Detailed maps of the emission from carbon monoxide molecules will provide the first clear view of the spiral structure of galaxies outlined by giant molecular clouds. The array will also allow astrophysicists to study the emission from the dust surrounding young stars in galaxies. Study of these emissions will reveal centers of star formation not visible with optical telescopes. These two new views of galactic structure will expand understanding of the now mysterious ways that spiral patterns in galaxies originate and sustain themselves.

(3) Because of its high sensitivity, the array will provide accurate measurements of the submillimeter wavelength emission from quasars and active nuclei of galaxies. These measurements will clarify the relationship between these enormously energetic objects and reveal the source of their energy. These measurements also will be crucial to distinguishing between the mechanisms leading to quasars that emit radio waves and those that do not. An explanation for these mechanisms is one of the most important unsolved enigmas in the quest for understanding the source of energy in quasars.

(4) The array will give new information about the surfaces and atmospheres of planets and other objects in the solar system. Maps of Mercury, Mars, Saturn's rings, and some dozen additional bodies will reveal the temperature and structure immediately beneath the surface. This information is needed to understand the nature of the subsurface composition. New data gathered on emission from molecules in the atmospheres of Venus and Saturn's satellite Titan should also provide insight into planetary weather.

(5) Finally, the array is likely to make unexpected discoveries. Only a few telescopes will be able to work at submillimeter wavelengths. The array's ability to discriminate spatially will be at least ten times greater than that of any of these other, single, submillimeter telescopes. If the past is any guide, this unique capability should lead to serendipitous discoveries.

The last frontier for ground-based astronomy consists of observing the skies with telescopes sensitive to submillimeter waves, light with wavelengths between those of infrared and radio waves. The radiation from the formation of stars and planetary systems, and from the puzzling processes taking place in the cores of galaxies and quasars, is usually most intense at submillimeter wavelengths. Therefore, scientists can best study such processes at these submillimeter wavelengths. Only in the past few years has technology advanced sufficiently to allow the construction of telescopes that can observe the universe at submillimeter wavelengths.

In 1982, the ten-year plan of the Astronomy Survey Committee of the National Research Council (NRC) recognized the desirability of submillimeter wavelength observations. Several single-antenna telescopes capable of such observations are now under construction or beginning operation. These telescopes will dramatically advance the field. None of them, however, will be able to discern details finer than about 10 seconds of arc. This limitation means that their resolving power will be less than one-tenth of the leading astronomical instruments in other wavelength regions, including the Very Large Array (VLA) and the Hubble Space Telescope (HST).

The NRC study also recommended development of advanced spatial interferometers at all wavelengths to improve resolving power. SAO's submillimeter wavelength telescope array will be a premier response to the NRC's recommendation. In 1983-84, a committee of seven SAO scientists conceived the proposed interferometric array; they subsequently published a study on the scientific need for the array and its technical feasibility. In particular, SAO scientists recommended an array of six submillimeter wavelength telescopes. The array would have resolving power of better than 1 second of arc. This resolution is far finer than for any single-antenna submillimeter wavelength telescope and comparable to that of the VLA and the HST.

Astronomers worldwide received SAO's 145-page study, and 25 astronomers with relevant expertise provided detailed reviews. (SAO received about a dozen other signed reviews.) The strong consensus of the reviews supported SAO's conclusion that a submillimeter wavelength array has very high scientific potential, is technically feasible, and is of appropriate scale for SAO to undertake.

Status and FY 1991 Plans - SAO began its submillimeter program in FY 1987. In that year, SAO hired a submillimeter receiver scientist and started to equip a receiver laboratory. With funding provided in FY 1988 and FY 1989, SAO continued to develop the laboratory and to increase its expertise in the technology for submillimeter receivers, and hired a receiver leader to direct the receiver development laboratory. In 1988, SAO hired a project scientist to oversee the design specifications for the array in the light of its scientific goals. Further, SAO hired a technical leader to coordinate the design and development of the array subsystems. In 1989, SAO added a project director to manage the array program.

With the FY 1990 funding requested under this line-item, SAO will complete the design phase of the submillimeter array project. Three individuals to be hired in FY 1990 will complete the design team. Collectively, they will concentrate initially on the design of the antennas for the array, the digital electronics associated with

the array, and the software involved with telescope control, data acquisition, and imaging of the celestial objects to be observed with the array.

For FY 1991, the Institution requests a total of \$3,799,000 for the submillimeter array program in the Major Scientific Instrumentation line-item. This represents an increase of \$2,518,000 over the FY 1990 base of \$1,281,000. These funds will be used to complete design and begin the construction phase of the array, in particular to:

(\$ Millions)

Contract for design and construction of the first two antennas-----	\$2.6
Equip digital laboratory; develop intermediate frequency transmission system and phase lock distribution system-----	0.5
Develop computer architecture and select suitable system-----	0.1
Start site development-----	0.2
Improve prototype of 345 GHz receiver-----	0.35
Initiate correlator development-----	0.05
Total, FY 1991	<hr/> \$3.8

The SAO line-item of this budget reflects the staffing requirements related to the Submillimeter Telescope Array. With the funding increase requested in its base for FY 1991, SAO will fill 12 new positions (12 workyears and \$746,000) for the project and support the space rental costs for these new positions (\$36,000). The personnel SAO will hire in FY 1991 and their locations are: .

Structural Design

Engineer	- Cambridge
Chief Programmer	- Cambridge
Purchasing Agent	- Cambridge
Digital Engineer	- Cambridge
Secretary	- Cambridge
Receiver Technician	- Cambridge
Research Associate	- Cambridge
Site Manager	- for site, to be temporarily based in Cambridge
Site Engineer	- for site, to be temporarily based in Cambridge
Programmer	- for site, to be temporarily based in Cambridge
Digital Engineer	- for site, to be temporarily based in Cambridge
Electronic Engineer	- for site, to be temporarily based in Cambridge

Project Schedule - SAO will complete the design study by the end of FY 1990 and initiate construction in FY 1991. Total costs are as in earlier estimates, about \$30 million (1987) or \$32.4 million (1989), including the design study and SAO personnel costs. SAO estimates annual operating expenses for the array to be about 8 percent of construction costs. The majority of these operating expenses represent personnel costs; SAO will hire almost all of these people during the design and construction phases of the project.

The following chart shows the total level of funding required for the project from FY 1989 through FY 1996.

PROJECTED FUNDING FOR SUBMILLIMETER TELESCOPE ARRAY
FY 1989 through FY 1996
(1989 dollars)

	<u>FTE</u>	<u>(\$ Millions)</u> ^{1/,2/}
FY 1989	3	0.8
FY 1990	6	1.6
FY 1991	18	4.7
FY 1992	23	7.0
FY 1993	28	6.5
FY 1994	28	5.4
FY 1995	34	5.4
FY 1996	34	1.0 ^{3/}
<u>TOTAL</u>	<u>174^{4/}</u>	<u>32.4</u>

^{1/} Rounded to the nearest \$100,000; represents 1989 dollars.

^{2/} Includes all personnel costs for the project.

^{3/} In addition, \$1.6 million will be required for approximately 6 months' operating expenses.

^{4/} Represents the cumulative workyear requirement over the eight-year period.

Conclusion - When operational, the SAO submillimeter wavelength telescope array will be a major scientific instrument of international stature. The array will be unique in the world in its combination of wavelength coverage and resolving power. It will measurably enhance the scientific competitiveness of the United States in astronomy. Since astronomical observations from space have suffered severe delays, the construction now of technologically advanced, pioneering ground-based instruments such as the SAO array is especially timely.

CONVERSION OF THE MULTIPLE MIRROR TELESCOPE

In FY 1988, SAO began the process of converting the Multiple Mirror Telescope (MMT) to a telescope with a single 6.5-meter diameter mirror. This conversion will more than double the light-gathering power of the telescope and increase its field of view 100-fold. The converted telescope will therefore allow scientists to observe many objects simultaneously. For certain types of problems, the converted telescope will permit more than a 100-fold increase in efficiency of data collection over the MMT.

Scientific Justification - The increased collecting area of the converted telescope will allow astronomers to gather, on objects 2.5 times fainter, data of the same quality as now obtained. This improvement will allow the use of the converted telescope in many new areas of research, where the extreme faintness of the objects involved precludes the use of the present telescope. Further, the added light-gathering power means that more than twice as much of the universe will be accessible for study than is now possible. SAO has already established itself as a world leader through the discovery and study of the "bubble" structure of the universe. Expanding such studies beyond the MMT's present horizon will be very important in determining if even larger structures exist. If they do, scientists might again have to rethink their understanding of the evolution of the universe.

The expanded capability of the converted telescope also will be especially beneficial for the study of clusters of stars and galaxies. SAO astronomers will be able to complete in a few hours projects that now require many nights on the MMT. For example, SAO scientists will conduct studies of the dynamics of clusters of stars, an area in which SAO scientists have been among the world leaders. Similarly, the study of clusters of galaxies, hitherto prohibitively demanding of telescope time, will become feasible. Research on these clusters may hold the key to understanding the distribution of matter in the universe. This distribution has a fundamental bearing on the evolution of the universe, in particular on how galaxies formed--a question that has baffled scientists for decades.

In addition, the telescope will be able to measure the velocities of gas in very distant galaxies. Astronomers can then compare these velocities, which are often related to the intrinsic brightnesses of the galaxies, with the apparent brightnesses of the galaxies to determine their distances. This technique will allow astronomers to determine the rate of expansion of the universe when it was younger. A measurement of this rate is critical for understanding the evolution and ultimate fate of the universe: Will it continue to expand forever, or will it eventually collapse?

The increased collecting area will allow pioneering studies of certain rapidly changing astrophysical phenomena. In such cases, changes occur too rapidly for astrophysicists to study them with any of today's telescopes. For example, some of these rapidly changing processes take place in double stars. The members of these stars are so close to each other that their surfaces almost touch. Scientists similarly can study phenomena in systems with one star whose core is so dense that not even light can escape from it--a black hole. Such systems give rise to very unusual conditions; their study will be possible with the converted telescope and will permit insights into new physical processes.

These examples provide just a small sample of the scientific justifications for the conversion of the MMT. A conference held at SAO in April 1986 resulted in a 50-page proceedings, which discusses in more detail the various reasons for the conversion.

Status and FY 1991 Plans - With funding provided for the conversion project in FY 1987, FY 1988, FY 1989, and FY 1990, SAO is:

- purchasing the materials required for the casting of the mirror in the University of Arizona Mirror Laboratory (the casting is currently scheduled for FY 1991);
- contracting with consulting engineers to carry out the preliminary concept and design of the telescope;
- developing the preliminary and detailed design of the primary mirror support and associated thermal control system for the mirror figuring, the cell to support the mirror, the building modifications, and the optics/support structure and telescope drive system.

For FY 1991, the Institution requests a total of \$1,995,000 to continue the conversion process. This represents an increase of \$1,100,000 over the FY 1990 level of \$895,000. The main efforts in FY 1991 will be to:

- cast the 6.5-meter primary mirror;

- begin fabrication of the mirror polishing support;
- begin fabrication of the primary mirror cell.

Project Schedule - SAO expects the conversion of the MMT will be completed by FY 1995 at a total cost to the Smithsonian of \$10 million (1987) or \$10.8 million (1989). This total includes amounts allocated in FY 1987 for glass and refractories, to meet projected requirements for FY 1990 and following years; the breakdown of funds by year is shown in the following chart. (The funding provided in FY 1988 was part of the one-year appropriation for SAO. Since FY 1989, the Smithsonian requested and received funding for the MMT Conversion as no-year funding in this line-item.)

PAST AND PROJECTED FUNDING FOR CONVERSION OF THE
MULTIPLE MIRROR TELESCOPE
FY 1987 through FY 1994
 (1989 dollars)

	<u>(\$ millions)</u> ^{1/}
FY 1987	0.5
FY 1988	0.5
FY 1989	0.6
FY 1990	0.9
FY 1991	2.0
FY 1992	2.4
FY 1993	2.3
FY 1994	1.6
TOTAL:	10.8

^{1/} Rounded to the nearest \$100,000.

Conclusion - The conversion of the Multiple Mirror Telescope is the most cost-effective way to ensure that Smithsonian astronomers will remain in the forefront of ground-based optical and infrared astronomy through the remainder of the 20th century and beyond.

INTERNATIONAL ENVIRONMENTAL SCIENCE PROGRAM

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	13	770	-	-	-	-	-	-	-	-
FY 1990 Estimate	13	781	-	-	-	-	-	-	-	-
FY 1991 Estimate	19	1,261	-	-	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The International Environmental Science Program (IESP) is a multi-bureau interdisciplinary effort to coordinate the Smithsonian Institution's long-term monitoring and study of unique and significant ecosystems. The goal of the Program is to evaluate and eventually predict the impact of human activities and natural change on selected ecosystems. Research sponsored by IESP occurs at two permanent Smithsonian sites--the Smithsonian Tropical Research Institute (STRI) in Panama and the Smithsonian Environmental Research Center (SERC) in Edgewater, Maryland--and several non-permanent sites throughout the world. (For FY 1990 and prior years, the International Environmental Science Program budget line-item appeared in the Special Programs section.)

For FY 1991, IESP requests an increase of 6 workyears and \$480,000 for global change research at STRI (3 workyears and \$200,000); greenhouse effect research at SERC (3 workyears and \$160,000); the Nile Delta Project (\$75,000); the biogeography of Panama (\$25,000); and the Dominica Study (\$20,000).

PROGRAM - The International Environmental Science Program sponsors research to meet the urgent need for long-term studies of the world's ecosystems, especially in tropical and subtropical regions where the rapid rate of tropical deforestation, loss of suitable soil, and resulting threat to wildlife are of critical importance. The Program provides funds for teams of scientists to monitor natural variations in specific environments unspoiled by humans. Recent U.S. Government and international commissions have reemphasized the need to expand long-term monitoring activities to gain further insight into biological diversity and the effects of global change.

Scientists maintain permanent IESP research sites at the Rhode River Estuary at Edgewater, Maryland, and, in Panama, in the tropical lowland forest of Barro Colorado Island, and the Galeta Reef on the Atlantic side of the Isthmus of Panama. For more than 15 years, scientists have gathered information for a data base on the biological, physical, and chemical components of these ecosystems. Analyses of these data have produced speculations and verifiable hypotheses about long-term patterns in climate and disturbances resulting from human activity.

Research sponsored by the IESP also takes place at nonpermanent sites on Aldabra in the Seychelles and in Nepal, Egypt, Venezuela, Brazil, Mexico, and the Amazonian regions of Peru and Bolivia. Smithsonian scientists, with support from the host governments, are continuing their efforts at these sites to gather descriptive data that will aid in the development of verifiable hypotheses about climate change, genetic diversity, animal management, and natural area management.

The following highlights IESP's research accomplishments for FY 1989 at the Program's permanent and nonpermanent sites:

Edgewater, Maryland - Scientists have quantitatively documented how forests buffer the adverse effects of agricultural runoff in the Chesapeake region. Traversing these forests are small feeder streams that carry chemical runoff associated with farming in the area. Studies of 50-100-foot-wide sections along the streams found the forests transpire, on average, two-thirds the sum of precipitation and groundwater inputs and remove nitrate at a rate of more than 85 percent and sulfate at a rate of 25 percent. Removal of these agricultural chemicals by these forests prevents them from flowing into the Chesapeake Bay and aids in the Bay's preservation.

Scientists at Edgewater also studied the qualitatively different functional roles of headwater forests on small streams and floodplain forests on larger streams in the removal of undesired chemicals. Results showed that headwater streamside forests trap primarily coarse particulates stemming from soil erosion, while floodplain forests trap finer particulates rich in phosphorus, a material used in agricultural fertilizers. Also, while headwater forests are more effective at processing shallow groundwater, floodplain forests are most effective at processing surface waters. The combination of forested streamsidess on small feeder streams and forested floodplains on larger streams helps protect the quality of water that flows into the Chesapeake Bay under the complete range of normal conditions.

Estuarine scientists have long sought to understand the mechanism controlling animal populations in bottom-dwelling invertebrate communities. A variety of theories, especially functional-group theories, propose that adults may regulate community composition by affecting the survival or behavior of settling larvae, and this effect differs among adult species. To test this hypothesis, Edgewater scientists studied the influence of two types of clams, *Macoma balthica* and *Mya arenaria*, on bottom-dwelling invertebrates to observe the potential importance of such interactions. Researchers transplanted the two clams at various densities into buckets of defaunated sediment during the spring. Results of this research showed both species had generally similar effects on the density of invertebrates. Both *Macoma balthica* and *Mya arenaria* reduced the total invertebrate population, with the greatest decline occurring at highest clam densities. Although the clams also affected the densities of individual invertebrate species, the two had varied influence among species and between years. Indirect effects of the clams, resulting from their influence on one or two dominant species, may be more important in the short term in determining the population of certain invertebrate communities. While the two clams had differing impacts among species, there was no noticeable variance in total invertebrate population, an outcome that calls functional-group theories into question.

Aldabra - Researchers continued surveys of the flora and fauna of this atoll in the Indian Ocean. The 1989 field season supplemented previous seasons' work and also initiated new projects.

The staff collected about 600 pounds of fossiliferous limestone for processing in the laboratory. These samples include numerous species of extinct birds, predominantly shearwaters and petrels. This collection will supplement the data gathered in 1987 and 1988. On Ile Michel, staff collected a large sample of subfossil land snails. The Natural History Museum at Leiden and the Smithsonian will process the material.

Researchers measured and photographed 55 giant land tortoise skeletons as part of a project, started in 1987, to document the pattern of disarticulation and decomposition of tortoises under dry conditions such as occur on Aldabra. Researchers also collected humeri for a project on aging.

To balance the inventory of marine algae in the Aldabra group, the staff visited previously uncollected sites and gathered several new or rare species. The algal list now includes about 120 species. Staff collected valuable reproductive data on several species of *Gracilaria*, a genus containing several commercially important members.

General collections of insects emphasized herbivorous Heteroptera. Researchers collected between 50 and 100 species of Heteroptera, some of which will probably prove undescribable. They also investigated plant-insect relationships for 30 plant species and obtained detailed information on distribution and ecology for seven species of marine Heteroptera, a useful addition to the knowledge of Indian Ocean zoogeography.

The staff monitored the distribution of sea urchins in seagrass beds, examining the role of heavy rainwater runoff and storm-generated sandy "blowouts" on patterns of distribution and mortality of urchins. Using direct observation as well as gut-content examination, staff members also investigated the predation on urchins by triggerfish. Preliminary results indicate that urchins occur mainly in blowouts where they are less susceptible to salinity and temperature fluctuations. Researchers will incorporate the results of these investigations into the long-term seagrass ecology study.

Nepal - In FY 1989, IESP supported the transformation of the former Smithsonian Terai Ecology Project field station in Royal Chitwan National Park to a South Asian ecology training center, NECTARI. The project, under the auspices of the King Mahendra Trust for Nature Conservation, pursues training in wildlife conservation and management skills that were introduced by the Smithsonian over the past ten years. The Smithsonian role in NECTARI is part of a collaborative enterprise with the World Wildlife Fund-United States and the U.S. Agency for International Development (USAID). The Smithsonian's share of support for this program will cease in FY 1992, although the Institution will continue to pursue specific projects in Nepal, most notably a program on the demography and reproductive biology of domestic Asian elephants with the support of USAID's Program in Science and Technology Cooperation.

Venezuela - During FY 1989, researchers conducted eight projects at the field site at Hato Masagural, Venezuela. Two projects studied the red howler monkey, a species that inhabits the gallery forest and savannah woodland habitat. The long-term demographic study of 55 social groups of this species involved monthly counts to develop a data base for interhabitat demographic comparisons. The study of the red howler diet involved detailed field observations of feeding in several social groups and studies of the animals captured last year to determine the total food intake, nutrient content, and digestibility of certain food plants that red howlers eat. Scientists will conduct future tests using several other food plants and more controlled conditions. The research project on the *Cebus*, the other primate species

found within the study area, included two separate investigations. One focused on the relative importance of demography, kinship, and dominance on social interactions within Cebus groups. The other dealt with the behavioral responses of Cebus to the presence of predators in the environment.

Nutritional analysis was an important component of the investigations of the dietary ecology of the Hoatzin, a bird that exploits several kinds of leaves. This investigation provides an opportunity to compare how sympatric species, from unrelated taxa and with different lifestyles and gut morphology, contend with the digestive and nutritional problems of folivory. Another ornithological project continues to monitor the long-term changes in the demography and species composition of two Venezuelan bird communities.

Researchers continue to study the snail kite, an endangered species in the United States. This year's investigations were intended to determine why this highly specialized feeder has diversified its diet in the llanos of Venezuela. The research included diet choice experiments, a study of seasonal changes in food abundance, and nutrient analysis of snail and crab meat. The snail kite investigators also conducted some preliminary studies on the nesting behavior of the parrotlet, a cavity nesting species that adapts well to artificial nests. This study may prove to have important conservation implications that scientists will develop further during the next fiscal year.

Other studies included investigations on caimans and the local moth fauna. The demographic study of caimans, the most heavily exploited genus of the world's crocodilians, included radiotelemetry and the continued monitoring of nearly 400 individually identifiable animals. This study also provided data on ranging patterns, reproductive biology, and growth rates that are invaluable in developing a plan for the conservation and management of caimans. The investigation of moths dealt with taxonomy, distribution, and the life history of species, especially those of economic importance. Entomologists at the National Museum of Natural History are currently examining and identifying the moth specimens collected in Venezuela. The majority of the research projects in Venezuela provided scientific training to young Venezuelan biologists.

Brazil: Golden Lion Tamarin Project - The Golden Lion Tamarin Conservation Program continued to break new ground with its unique integration of basic research and conservation in the endangered Atlantic coastal rain forest of Brazil. During FY 1989, scientists continued monitoring the reintroduced golden lion tamarins in and near the Poco das Antas Reserve. By July 1989, 25 reintroduced tamarins remained from the original 67 released between FY 1984 and FY 1988, and 13 young survived from 15 born. The wild population has increased by 38 individuals in 11 groups. Scientists will release an additional 10 animals in FY 1990. Moreover, scientists have involved local landowners in the protection of the golden lion tamarin, and, by the end of FY 1989, reintroduced tamarins will be living in remnant forest patches on seven ranches.

Other studies of the behavior and ecology of wild golden lion tamarins continue, and scientists initiated several new studies of the fauna and flora of this endangered habitat in FY 1989. Analyses of habitat characteristics of wild tamarins now permit a description of the type of forest and density of critical resources in habitats golden lion tamarins prefer. An average tamarin family group, for example, has 5.2 members, and in a 0.1 hectare transect of their home range, has 4.3 dens in trees, 9.3 bromeliads, and 0.3 percent swampland. The dens are used for sleeping; the bromeliads

contain water and small vertebrates and invertebrates that are prized foods; and the swampland contains preferred fruit trees. Information on habitat permits a more refined approach in choosing new habitats for future reintroductions and allows an analysis of differential mating success in groups relative to the presence of critical resources.

Studies of the density and distribution of small mammals in different habitat types continue. Additionally, scientists have recently trapped and radio tracked the rare and elusive bamboo rat. Researchers hope to chart the life history of this unusual rodent, determining its reproductive rate, mating system, and degree of territoriality. Researchers initiated studies of seed dispersal from different-sized forest plots and the role of bird species in dispersing seed in order to chart the processes of regeneration of tropical forest from pastureland and degraded habitats.

Educators continue to work closely with the local community in the region surrounding the major remnants of golden lion tamarin habitat. They are also training other educators in techniques of promoting a conservation ethic in small communities. In FY 1989, for example, they held another training course for education specialists from Brazilian parks and reserves. Finally, the new headquarters and education center for the Poco das Antas Reserve are now fully functional. Together they establish a significant center for conservation biology in the critical ecosystem of the Atlantic coastal forest of Brazil.

Brazil: Neotropical Lowland Research Program - In FY 1989, scientists conducted field and laboratory work in archeology, botany, entomology, ichthyology, and herpetology on the Amazonian and Atlantic forest biota. Results of these investigations provided new information on the composition and distribution of the neotropical biota that is important for the completion of several major publications and conservation planning. A highlight of the past year was the publication of Proceedings of a Workshop on Neotropical Distribution Patterns, a 488-page written record of a workshop cosponsored by the Smithsonian Institution and the Academia Brasileira de Ciencias with additional support provided by the National Science Foundation and the Conselho Nacional de Desenvolvimento Cientifico e Tecnológico. The publication includes six papers by Smithsonian participants.

All the individual research projects are long term and will proceed for the next five years. The anticipated addition of new long-term projects in botany and entomology will further strengthen the multi-disciplinary nature of the Program. Toward the end of the next five-year period the Program plans to hold another interdisciplinary, international workshop or symposium.

Panama - IESP-funded research on Barro Colorado Island (BCI) continues to expand understanding of global change and to develop techniques for agroforestry and reforestation. Analysis of accumulated data from physical monitoring indicates an average decrease in rainfall on BCI of eight millimeters per year since 1923, for a total decrease of 20 percent over this time period, a decrease that may result from surrounding deforestation. Hydrographic and Meteorological Studies of a Caribbean Fringing Reef at Punta Galeta, Panama: Hourly and Daily Variations for 1977-1985, by John D. Cubit et al. (Smithsonian Contributions to the Marine Sciences, no. 32), published by the Smithsonian Institution Press in 1988, represents a summary of the physical monitoring until 1985. A similar summary of BCI data, edited by Donald Windsor, is now in press. As rainfall has declined, average temperature and rates of evapotranspiration have increased. Evidence from the forest irrigation study suggests that some species of trees may now be under considerable water stress during the dry

season. Data from the Forest Dynamics Project show that occasional droughts significantly affect the recruitment of young trees into forest populations.

At Galeta, long-term monitoring of reef and mangrove communities continues to provide invaluable background for analyses of the impact of the April 1986 oil spill on these areas. IESP studies are supplemented by a five-year contract from the Minerals Management Service of the Department of the Interior that recognizes IESP's unequaled biological record at Galeta and benefits from its previous monitoring activities. Evidence gathered to date indicates that the effects of oil spills on tropical marine habitats are more severe and long lasting than previously suspected.

Mexico - In FY 1989, IESP characterized the damage Hurricane Gilbert wrought on a dry tropical forest and initiated long-term studies to determine how plant and animal populations recover from this kind of disturbance. FY 1989 results showed that the forest was completely defoliated and that most trees, although heavily damaged, survived. New leaves began to develop within one month. The greatest degree of change occurred in the understory where numerous vines, which survived the hurricane, began to sprout and grow rapidly. Soil studies show that few tree species maintained viable seeds in the soil before the hurricane. Scientists will base the recovery of the forest primarily on the growth of trees that survived the hurricane. Within four months, the diversity of birds found in the forest was as high as before the hurricane and most closely resembled the bird community found more typically in open habitats. Only two species of birds that were common before the hurricane were not present immediately afterward.

In FY 1990, scientists will continue adding phosphorus fertilizer to half the long-term study plots to test the hypothesis that phosphorus limits the growth of dry tropical forests. Investigators will also continue to characterize the recovery of the forest by studying the growth and recovery of trees, shrubs, and vines; measurements of leaf litter produced by the forest and the nutrient content of the litter; decomposition rates of the massive amount of wood that fell to the forest floor; and recovery of the bird community.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, IESP requests an increase of 6 workyears and \$480,000 for global change research at STRI (3 workyears and \$200,000); greenhouse effect research at SERC (3 workyears and \$160,000); Nile Delta Project (\$75,000); the biogeography of Panama (\$25,000); and the Dominica Study (\$20,000).

Global Change Research at STRI (3 workyears and \$200,000) - The collection of long-term data in tropical environments is increasingly important for understanding global change. Continued support of long-term monitoring programs at STRI will enhance the collection and use of this data.

Physical monitoring of meteorological and hydrological variables is performed at Barro Colorado and the Galeta marine laboratory. Researchers plan expansion of physical monitoring to other sites in the San Blas and Naos Islands and in the Perlas Islands in the Pacific. These studies will enable researchers to better understand how tropical habitats respond to changes in physical parameters such as rainfall, temperature, sea level, and the mix of gases in the atmosphere. Physical monitoring data is used by visiting and staff scientists at STRI and elsewhere, as well as by atmospheric scientists, climatologists, and resource managers studying global climate change. To expand its physical monitoring, IESP requests one workyear and \$71,000 to hire an environmental engineer and technician and to purchase and install monitoring

equipment at the Pacific marine laboratory at Naos Island. IESP will require additional funding in FY 1992 to annualize the partial-year costs of these positions.

IESP began studying various biological species at Barro Colorado Island and Galeta more than 15 years ago. Today, with rapid global change predicted into the 21st century, biological monitoring has become increasingly important. An expanded long-term biological monitoring program will establish a critical baseline and document future biological response to these changes. An increase of \$34,000 will permit an expanded program of biological monitoring at the San Blas Island station on the Caribbean coast of Panama, where STRI is building a new marine station. This monitoring program will replace the data base on natural variation at Galeta that was terminated by the 1986 oil spill. Future plans involve expansion to Pacific habitats for comparison of organisms and communities in the Atlantic and Pacific, unique comparisons that STRI's location on the isthmus make possible.

With the continued and expanded physical and biological monitoring, IESP requires additional personnel and equipment to properly manage and analyze data collected. IESP currently depends on the computing resources of several other programs and personnel at STRI, where the physical and biological monitoring data base contains approximately 30 years of combined information collected at the Galeta marine station and on Barro Colorado Island. IESP requests 2 workyears and \$95,000 to hire a data manager and technical assistant who will maintain and add to this existing data base. Remaining funds will permit the purchase of upgraded computer equipment. An enhanced data management program will allow IESP scientists to analyze, interpret, and publish data expediently. This capability is especially important as the monitoring program expands to the Pacific and San Blas.

Greenhouse Effect Research at SERC (3 workyears and \$160,000) - Scientists know very little about the effects of increased atmospheric concentrations of carbon dioxide on forest ecosystems or about the effects of forest ecosystems on atmospheric composition. Quantitative work on the exchange rate of carbon dioxide between various forest canopies and the atmosphere is not well documented. To increase the understanding of the impact increasing gas concentrations have on the forest environment, IESP requires support to study these interactions.

In FY 1989, researchers initiated a small pilot study comparing these processes in a temperate hardwood forest in Edgewater and a tropical hardwood forest in Panama. Scientists hypothesize plant communities in tropical and temperate forests are similarly affected by atmospheric change, particularly carbon dioxide levels. Increased levels of carbon dioxide prevent the proper radiating of light, especially infrared, through the atmosphere. This light, instead, is absorbed and converted to heat, increasing the temperature of the Earth and leading to the greenhouse effect. SERC scientists will examine how increased carbon dioxide concentrations will affect forest productivity, water-use efficiency, and the dynamics of forest atmospheric gas exchanges.

The requested funds will pay the costs of an environmental engineer and two physical science technicians to conduct the research. Remaining funds will support travel, supplies, and equipment.

The impact of greenhouse gases on the environment is of growing worldwide concern. The goal of greenhouse effect research at SERC is to determine how forests in temperate and tropical latitudes interact with the atmosphere as the concentration

of carbon dioxide, nitrous oxide, methane, and chlorofluorohydrocarbons increase globally.

Nile Delta Project (\$75,000) - The Nile Delta of Egypt is presently undergoing marked changes induced by accelerated coastal erosion and subsidence of its low-lying delta plain surface and by cutoff of the sediment supply resulting from the opening of the High Aswan Dam in 1964. These natural and human-induced modifications have resulted in the loss of fisheries, rapid erosion of coastline, extensive salt incursion, and diminished agricultural production--serious environmental consequences that affect the welfare of more than 50 million people living within the Delta's confines. The National Museum of Natural History is coordinating a long-term multi-disciplinary study of the northern Nile Delta, the sector most prone to change. Geologists and biologists at the Smithsonian in collaboration with staff from 11 associated laboratories in the United States, Egypt, and Europe, initiated research in 1985. The primary aim of this project is to define and calibrate the sedimentary and ecological evolution of the Nile Delta from 10,000 years ago to the present. This information will assist Egypt in responding to the urgent need to protect its rapidly disappearing natural ecosystems and agricultural lands.

The requested funds will permit continued analysis of age-dated sediment borings recovered from the northern Nile Delta. Petrological, biological, and radiocarbon data will enable IESP to compile detailed stratigraphic maps and, in turn, to interpret changes with time in the earlier positions of the coastline, the major paleo-Nile distributary channels, the rates of subsidence versus sea-level changes during the Holocene, and the paleoclimatic fluctuations affecting east Africa and the eastern Mediterranean. Members of the project team are analyzing about 100 sediment borings collected across the Delta.

The welfare of the rapidly growing population in Cairo and the Nile Delta will continue to be directly related to the evolution of the delta and the influences of global climate change. Research involving evaluation of past geographic and ecologic fluctuations provides a base with which to help measure present changes (both natural and human-induced) and those most critical and likely to affect the northern Delta in the next century.

Biogeography of Panama (\$25,000) - A team of scientists from the National Museum of Natural History, National Zoological Park, Smithsonian Tropical Research Institute, and Jacksonville Museum of Science and History is inventorying and monitoring the island ecosystems of Bocas del Toro, Panama. The small discrete islands provide an opportunity for understanding the function of tropical rain forest ecosystems. Research of the forests is imperative as the island inhabitants clear the land for pasture.

Requested support will enable the investigation of biogeography and evolution to continue. Scientists are studying mammals, birds, reptiles, amphibians, plants, and molecular systematics. Inventories of the islands and the adjacent mainland have revealed:

- depauperate faunas and floras, varying from island to island;
- presence of relict taxa from old ecosystems now absent on the nearby mainland;

-- morphological differentiation at the level of species or subspecies between island and mainland, and even from island to island.

The project team also is studying the phenomenon of a large-scale response to small-scale isolation to explain why the biota of these young, small islands, lying in shallow water close to shore, apparently ecological and climatically undifferentiated, respond to modest isolation as though they were far at sea. Based on the results of this and other field studies and inventories, researchers will make recommendations to the government of Panama for protecting the unique flora and fauna of these islands and for salvaging and managing unique ecosystems that are disappearing as pasture replaces the tropical rain forests.

Dominica Study (\$20,000) - Between 1964 and 1968, the Smithsonian carried out a baseline survey of the flora and fauna of Dominica that provided almost 2,000 pages of publications detailing the biodiversity of the island at that time. Now the Institution has an opportunity to reassess the biota of Dominica after 25 years, during which time severe damage by Hurricane David and some deforestation by logging operations have occurred.

The requested funds will allow scientists to carry out an ecological-environmental study against the unique body of baseline data assembled by the Smithsonian a quarter century ago. The study will delineate the relative impacts on an island ecosystem of a natural disaster and human incursions and will compare reef areas of the island with those of other parts of the Caribbean.

Comparison of Dominica's present-day ecosystems with those of 25 years ago will enable scientists to better understand the effects of natural and human intrusions. Reassessment of Dominica's biota in FY 1991 can benefit from the expertise of National Museum of Natural History staff who participated in the original baseline study. It is important that the study take place while these scientists are still on staff and before continuing population growth and outside influences on Dominica change its ecosystem any further. In addition, the Archbold Center for Tropical Studies, a permanent research facility on the island, now provides a stable base for long-term comparative research. The Center is managed by a consortium that includes the Smithsonian.

MUSEUMS

OFFICE OF THE ASSISTANT SECRETARY FOR MUSEUMS

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	24	1,633	1	193	-	61	1	155	-	-
FY 1990 Estimate	24	1,168	1	239	-	-	1	173	-	-
FY 1991 Estimate	30	1,616	1	253	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of the Assistant Secretary for Museums (OASM) provides operational oversight for 12 museums and six major bureaus. It manages essential museum functions, including collections management, exhibitions, education, public orientation, and operations. OASM acts as a liaison with national and international museum organizations and conducts special studies to improve museum operations and methods. This line-item also includes the Office of Museum Programs (OMP) and the Office of the Registrar (OR). The Office of Museum Programs provides training and research services to the museum profession nationally and internationally. The Office of the Registrar is responsible for the development, oversight, and coordination of the Smithsonian's collections management policies.

For FY 1991, the Institution requests an increase of 6 workyears and \$448,000: to explore African-American programming (2 workyears and \$200,000); to provide a program manager and clerical support for the Office of the Assistant Secretary for Museums (2 workyears and \$80,000); to provide a program manager and an intern coordinator for the Office of Museum Programs (2 workyears and \$122,000). Also, an increase of \$46,000 justified in the Uncontrollable Increases section of this budget will support the Office of the Registrar's payroll base deficiency.

PROGRAM - I. Office of the Assistant Secretary for Museums - With base funding of 9 workyears and \$579,000, the Office oversees the operating and public functions of Smithsonian museums and encourages the development of new techniques in museum administration and practices. The Office administers two Trust-funded programs, the Collections Acquisition Program, which helps with the purchase of major acquisitions by Smithsonian museums, and the Special Exhibition Fund, which provides partial funding for important and innovative exhibitions. The Office is planning the new Experimental Gallery, for the Arts and Industries Building, where new techniques can be tested for presenting information and objects to various types of audiences. The Office also works closely with specialized committees of native Americans, Latinos, educators, and others to improve programs related to minorities; encourages cooperation between Smithsonian and outside museums with common interests; and participates in planning new museum initiatives. In addition, the Office works

cooperatively with national and international museum organizations and professionals in the areas of education, exhibitions, and collections management.

II. Office of Museum Programs - With base funding of 12 workyears and \$438,000, the Office of Museum Programs (OMP) provides training and research services to the museum profession nationally and internationally. A major office reorganization in FY 1989 redirected staff resources toward service to minority students and museum professionals through career counseling, intern placement, and Minority Awards scholarships for residences at the Smithsonian. OMP has developed workshops and seminars in collections care, exhibition development, audience research, and museum learning for Smithsonian museum staff. In addition, OMP coordinates international exchanges in museum theory and practice.

The Office continues to coordinate intern placement at all Smithsonian museums, and to provide orientation programs and career counseling for students and new Smithsonian staff. Museum career surveys produced by OMP encourage greater cultural diversity among entering professionals across the country. OMP has developed a national network in museum studies, providing liaison among colleges, universities, and professional associations.

The Instructional Resources Service of OMP continues to distribute videotapes and publications for training programs throughout the United States. In FY 1989, the Institution reorganized the Museum Reference Center (MRC), a unique library service of museological reference and research. MRC now has new public facilities, a refocused collections policy, and a clarified mission in support of the OMP curriculum.

III. Office of the Registrar - With base funding of 3 workyears and \$151,000, the Office of the Registrar (OR) designs systems that keep the National Collections safe from harm and permit access by the widest audience possible. The National Collections--a red diamond, a yellow orchid, a Gilbert Stewart painting, Dizzy Gillespie's oddly bent horn--reflect the diversity of American interests. The Smithsonian represents these interests through more than 135 million artifacts and specimens.

Researchers and the public gain access to the National Collections through the Collections Information System (CIS). Staff enters information about each object or specimen into CIS and subsequently uses this information in exhibitions, publications, and public programs. Automation of CIS is a multi-year, interbureau effort organized by OR. This effort identifies appropriate technology, training needs, and resources crucial for effective collections management.

OR designs inventory and internal control procedures to provide accountability for Smithsonian collections. Collections management policy results from interaction between OR and the bureaus. In FY 1988, OR undertook the revision of the Institution's primary collections management policy directive. The Registrar's Council, which includes registration department staff from all Smithsonian museums, offers essential staff training and opportunities for the exchange of information. Working with the Office of Museum Programs, OR teaches principles and techniques of collections management to museum colleagues. As a leading participant in the International Council of Museums Documentation Committee, the OR maps the development of collections automation systems worldwide.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Institution requests an increase of 6 workyears and \$448,000: to explore African-American programming (2

workyears and \$200,000); to provide a program manager and clerical support for the Office of the Assistant Secretary for Museums (2 workyears and \$80,000); to provide a program manager and an intern coordinator for the Office of Museum Programs (2 workyears and \$122,000). Also, an increase of \$46,000 justified in the Uncontrollable Increases section of this budget will support the Office of the Registrar's payroll base deficiency.

I. Office of the Assistant Secretary

African-American Programming (2 workyears and \$200,000) - The Smithsonian seeks to respond to the needs and concerns of the African-American community through increased exhibits, studies, public programs, and other activities in the field of African-American culture not currently offered by the bureaus.

To strengthen this initiative, the Office of the Assistant Secretary for Museums will organize and provide staff to a broadly based advisory committee to advise the Institution on the feasibility of an African-American physical presence either within an existing Smithsonian museum or a new national African-American museum located in the Washington metropolitan area. The office will also explore collecting issues through symposia and meetings with outside African-American collecting organizations, including traditionally black colleges and universities. Additionally, relationships with African-American museums and cultural centers, as well as organizations such as the Congressional Black Caucus, and the African American Museum Association, will be strengthened through establishment of an information-exchange network on holdings, collections management, standards of curation, and the production and circulation of traveling exhibits. With these relationships and resources, the Smithsonian will then participate in and make additional contributions to African-American studies.

The Office will use the requested resources to hire a director and a program assistant and to purchase supplies, equipment, and services. Funds will also support staff travel and expenses associated with the advisory committee and its members.

Working with a variety of African-American organizations, OASM will explore ways to highlight the collection-building and curatorial needs of African-American studies and consider the possibility of a dedicated presence within the Smithsonian museums.

Program Manager and Clerical Support (2 workyears and \$80,000) - The Office of the Assistant Secretary for Museums works to provide staff support for a number of existing and emerging initiatives within the Smithsonian museum community. Among the new initiatives is planning for the Museum of the American Indian and an African-American presence on the Mall. In addition, the Office continues to promote recruitment of women and minorities throughout Smithsonian Museums and conducts searches for Smithsonian museum directorships.

With these new and continuing initiatives, the volume and complexity of OASM activities have created unwieldy and unreasonable workloads for the present program staff. The Office will use the requested resources to hire a program manager and a secretary and to purchase supplies and equipment. This increase to the base resources of the OASM will provide the necessary program assistance to:

- plan for the Museum of the American Indian and an African-American presence on the Mall;

- conduct broad and affirmative action recruitment for senior management of the bureaus;
- respond more effectively to the many requests for information, assistance, and cooperation from museums and museum professionals, both nationally and internationally;
- facilitate OASM efforts to promote in-house training and professional development for Smithsonian staff.

This increase will heighten OASM's effectiveness in responding to the bureaus under OASM oversight as well as the outside museum community.

II. Office of Museum Programs

Program Manager and Intern Coordinator (2 workyears and \$122,000) - Among the professional training programs for museum workers, OMP provides the most comprehensive continuing curriculum in North America. Entry-level, mid-career, and senior staff at emerging museums throughout the Nation and around the world receive relevant, current, and integrated training and gain improved practical and theoretical understanding of the missions of their institutions within their own communities. Through OMP's internship program, students and new professionals receive opportunities for intellectual growth and public service. To ensure the continued viability of Smithsonian training programs, OMP requires increased leadership and coordination.

A full-time program manager for curriculum will coordinate faculty selection and training, direct curriculum development, produce instructional materials and publications, and supervise ongoing evaluation of study programs at OMP. The program manager will also supervise the services and collections of the Museum Reference Center.

A full-time intern coordinator will complete the consolidation of residency programs in OMP. The intern coordinator also will counsel students and entering professionals, placing them with trained faculty in Smithsonian museums. Seminars and videotapes produced by the intern coordinator will orient students to the museum profession and the necessary steps in professional training. In concert with colleges and universities, the intern coordinator will direct an international reference service in museum studies. General public inquiry and specific academic planning will also benefit from this focused, full-time effort.

Resident study in museum practices is the most effective way to move from the classroom to professional museum work. Individuals who come to the Institution to learn the various functions of museums--research, collecting, conservation, exhibition, education, and administration--best through apprenticeship. OMP will make these experiences more efficient and educationally profitable with the addition of this program request.

NONAPPROPRIATED SOURCES OF FUNDING:

I. Office of the Assistant Secretary for Museums: Unrestricted General and Special Purpose Funds - Annual allotments provide unrestricted funds from the Smithsonian Institution's unrestricted general Trust funds to support the salary, benefits, and expenses of the Assistant Secretary; expenses for directorship search committees; and Institutional memberships in professional associations. Special

purpose funds provide support for the Collections Acquisition Program, which facilitates the purchase of major acquisitions by the Smithsonian museums, and the Special Exhibition Fund, which provides partial funding through a competitive process for important and/or innovative exhibitions throughout the Institution.

Restricted Funds - In FY 1989, the Office of the Assistant Secretary for Museums received a grant of \$150,000 from the Rockefeller Foundation for the development of an Experimental Gallery to study alternative approaches to exhibition design and production.

II. Office of Museum Programs: Unrestricted General and Special Purpose Funds- The Office of Museum Programs receives an annual allotment for awards to minority professionals attending the OMP workshops. These awards help defray travel and subsistence expenses. In addition, OMP has two revolving Trust funds for training and for the audio-visual loan and sales program to accommodate fees and services.

Restricted Funds - From FY 1982 through FY 1988, the Kellogg Foundation sponsored the Office of Museum Programs' project to "expand the educational influence of museums." The goal of the grant was to establish a network of museums throughout the United States that would examine issues and implementation strategies so that museums could increase their educational impact in their communities. In the course of the grant period, decision makers from museums and representatives from other educational sources explored all aspects of museum operations. OMP will disseminate the print and nonprint products of the project.

III. Office of the Registrar: Unrestricted General and Special Purpose Funds- The Office of the Registrar receives an annual allotment to fund salary and support costs for the administrator of the Collections Information System.

NATIONAL MUSEUM OF NATURAL HISTORY/MUSEUM OF MAN

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	570	26,292	3	224	3	700	17	3,162	18	1,728
FY 1990 Estimate	584	27,573	3	322	3	1,053	17	3,085	10	780
FY 1991 Estimate	619	30,747	3	378	4	1,231	17	3,102	10	759

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Museum of Natural History/Museum of Man (NMNH/MOM) houses the largest and most valuable assemblage of natural history specimens and human artifacts in the world. The Museum staff engages in the acquisition, preservation, care, and study of these collections. Museum scientists and scholars conduct research on living and fossil animals and plants, rocks, minerals, and meteorites. The Museum disseminates knowledge about the natural and cultural diversity of the world and conducts internal and outreach programs to fulfill its commitment to science education for schoolchildren.

For FY 1991, NMNH/MOM requests an increase of 35 workyears and \$3,174,000 justified fully in the Explanation of Program Increase section of this narrative.

The requested increase includes \$1,000,000 to support major exhibit hall renovations be available until expended.

PROGRAM - The collections of the National Museum of Natural History/Museum of Man contain more than 119 million specimens of plants, animals, fossils, rocks, minerals, and human cultural artifacts. They are essential to the Nation's scientific community, because they provide fundamental documentation for the study of humankind and of the flora, fauna, and geology of our planet and outer space. The Museum shares its work with the scholarly community through publications, symposia, and scholarly exchanges and with the public through exhibitions, publications, and educational programs. More than seven million visitors to the Museum in 1988 are testimony to the success of NMNH/MOM's public programs. These attendance levels make the Museum the most heavily visited natural history museum in the world.

In FY 1988, the Museum's collection increased by approximately 537,100 specimens. This increase resulted from donations, purchases, expeditions of Museum scientists, and deposits from other government agencies. The Museum is responsible by law to serve as the ultimate repository for the collections of natural history, archeology, and ethnology gathered by U. S. government agencies. In addition, it provides laboratory space and research facilities for more than 50 scientists from affiliated Federal agencies with natural history missions, such as the Department of Agriculture,

National Marine Fisheries Service, Fish and Wildlife Service, Geological Survey, and National Institutes of Health.

Worldwide Research - Scientific research on the Museum's collections and the publication of scientific findings are fundamental to the mission of the Museum. Some of the Museum's 1988 research initiatives include:

-- Global change: As concern about changes in the global environment continue to increase, the Museum is giving greater emphasis to programs and projects that will contribute to our understanding of these changes.

For the third consecutive year, the Museum sent teams of scientists to Amazonia forests in the Manu Reserved Zone, Peru. Here long-term, in-depth biodiversity inventories are under way with the collaboration of the Peruvian government. Data from these studies will help protect many of the rare and endangered species of the neotropics. Some of these plant species may yield new sources of food, medicines, biological controls, and important germ plasm for agricultural use.

The Museum continued its long-term participation in a multi-national effort to investigate the biological diversity of the Guianas. Among the explorations mounted by the Museum in 1989 was a collecting expedition led by a Museum botanist and two World Wildlife zoologists to Kato, Kaieteur Falls, and Paramakatoi, Guyana.

Museum scientists continued a long-term study of the composition, distribution, and evolution of the plants and animals in Amazonia and the Atlantic forests. The Museum plans to research an additional site in the Amazon in the near future.

-- Early man: New dates and discoveries at an early hominid site at Olorgesailie, Kenya, under continuing excavation by a Museum anthropologist, reveal it to be one of the longest and richest records of the mid-Pleistocene, with artifacts and faunal remains dating from 220 thousand to 1.1 million years ago. During the 1989 field season, excavations will begin to uncover evidence of human use of the landscape one million years ago.

Conferences and Workshops - The Museum organizes major international symposia to exchange scientific knowledge and ideas. Symposia also provide the public with greater knowledge of important scientific research. In addition, the Museum sponsors training workshops for the scientific community. Some notable 1988-89 gatherings include:

-- "Crossroads of Continents": At a major public symposium marking the opening of the Museum's "Crossroads of Continents" exhibition, leading Soviet and American scholars presented new findings on the archeology, ethnography, folklore, history, and current status of the ancient cultures of the North Pacific.

-- "The Poetics and Politics of Representation": This jointly sponsored Smithsonian-Rockefeller Foundation symposium brought 24 scholars from the museum community, including specialists in art and ethnology, to critically examine the way culture, history, and ways of life of different peoples are portrayed in museum exhibitions.

-- Caribbean Mangrove Ecology Workshop: Three dozen scientists participating in the Museum's Twin Cay, Belize, mangrove community study met to discuss findings. This long-term project, involving Smithsonian scientists and colleagues from American and

European universities and museums, is documenting the biology, geology, ecological balance, economic importance, and aesthetic value of a mangrove swamp, using the example of a diverse and undisturbed one-square-kilometer swamp community on the barrier reef of Belize, a tiny Central American nation on the Caribbean coast.

-- Forensic anthropology: Twenty-two forensic anthropologists, medical examiners, and law enforcement personnel from the United States, Canada, and Central America, attended a week-long workshop on forensic anthropology, organized by the Museum's Department of Anthropology.

-- "Changing Patterns of Disease and Demography in the Americas before and after 1492": The Museum's third Columbus Quincentenary public forum brought leading international authorities together to discuss current research on human disease experience in the New World before and after the contact period.

Research Publications - A few of the 481 publications completed by Museum staff during 1988-89 include:

- Global Volcanism, 1975-1985: The First Decade of Reports from the Smithsonian Institution's Scientific Event Network (SEAN): Reports from the SEAN Bulletin, a monthly publication of the Museum's Scientific Event Network, survey the decade's full spectrum of volcanism: small eruptions as well as large, and subtle warning signs as well as disasters.
- History of Indian-White Relations, vol. 4 of the Smithsonian's encyclopedic Handbook of North American Indians: Written by leading historians and anthropologists, the book surveys the history of Indian and white relations in North America from colonial times to the present.
- Native Writings in Massachusetts: To compile and write this book, two Museum anthropologists sought out and for the first time systematically transcribed and translated all known documents written by the Indians of southeastern Massachusetts in the Indian language, opening a window onto a segment of the history of colonial Massachusetts previously known only in fragments. The present-day Mashpee and Gay Head communities on Cape Cod and Martha's Vineyard--the principal descendants of these Indians who wrote in the Massachusetts language--have hailed the two-volume work as a major contribution to their cultural patrimony.
- A Field Guide to the Marine Plants of the Caribbean: This guide, the first in its field, was researched and photographed in color by a team of four Museum marine botanists. Designed for both the marine biologist and the amateur skin diver, the guide took eight years to complete and involved oceanographic expeditions from Bermuda to Brazil and the Lesser Antilles to Panama.
- Introduction to the Study of Meiofauna: This is the first book to comprehensively sum up new advances in knowledge of a group of microscopic invertebrates of key ecological importance, living in freshwater and marine sediments. The book is coedited by a Museum marine zoologist who is one of the world's top authorities on meiofauna. Among the 54 essays in the book are contributions by six Museum researchers.

-- An Interdisciplinary Bibliography of Freshwater Crayfishes: This book by two Museum researchers brings together for the first time all the scientific literature on freshwater crayfishes, as well as popular books and articles dealing with biological aspects of crayfish--more than 11,000 listings.

Collections Management - The Museum's more than 119 million specimens require continuous care and conservation as well as enhancement through acquisitions. Aided by the Smithsonian's Office of Information Resource Management, the Museum's multi-year effort to convert the collections inventory data base to a modern on-line Collections Reference System (CRefS) is under way. The Museum has transferred approximately 1.5 million collection records from the Departments of Vertebrate Zoology and Botany, permitting faster retrieval of collections information, immediate updating of records, and greater accuracy of data. Conversion of base inventory data in the Departments of Anthropology and Entomology will bring an additional 600,000 records on-line by early fall 1989.

NMNH/MOM is continuing plans for an electronic collection image system of the Museum's native-American artifacts. The goal is to provide native-American artifact images to tribal museums and educational institutions throughout the country. The Museum also continues work on long-range conservation strategies in an effort to improve physical care of the collections. A department-by-department survey will determine conservation priorities.

Continuing projects in 1989 also included moving approximately 418,000 specimens to the Museum Support Center (MSC); cleaning and stabilizing 1,500 collection items to prepare them for the move to MSC; incorporating 537,000 specimens acquired in 1988 into the collection; and maintaining the loan and exchange programs, the most active of any museum in the world. The Museum loans and exchanges an average of 300,000 items annually.

Notable 1988-89 acquisitions include a collection of 4,000 silver spotted fritillary butterflies collected in Nebraska and eight other Western states, Canada, and Mexico. With many rare specimens, it is one of the finest butterfly collections donated to the Museum in recent years.

The Museum also acquired one of the finest private collections of American coal-age fossils ever amassed. Comprising 2,500 Paleozoic era specimens of exceptional quality and spectacular size, it includes one-of-a-kind and rare imprints of ancient coal-forest seeds, cones, fern branches with long needlelike leaves and the scalelike bark of fossilized trees that grew 100 feet.

Exhibitions - Exhibitions are an important component of the Museum's commitment to communicate research to the public.

In the past year, the Museum has made significant progress in its effort to modernize the Native-American Halls. Museum staff have developed innovative and experimental displays for evaluation, testing, and possible incorporation into new permanent displays. A small theater shows films by and about native Americans; a demonstration area presents live performances and demonstrations of native-American handicrafts throughout the summer; and new displays continue to replace old exhibits. The Museum established a new temporary exhibits space. Physical improvements include new carpeting, new paint colors, lighting, and graphic enhancements. Planning continues for the creation of new permanent halls on native-American cultures. Based

on the written prospectus, "A Vision of the Americas," designers are proceeding with thematic plans, conceptual space organization, and design models.

In addition, six hall renovations are currently under development as part of the Museum's long-term renovation plan to update 30 halls. These include:

- Life in the Ancient Seas: The final element of the Museum's new permanent paleontology exhibition complex is scheduled to open in spring 1990. One of the exhibition's highlights will be a huge floor-to-ceiling mural, 121 feet long and 16 feet high--the first of its size and scope ever created--depicting life in the ancient seas, 200 to 500 million years ago.
- Insect Zoo: Since opening ten years ago, the live Insect Zoo has become one of the Museum's most popular exhibits. The Museum has recently completed a new design model, with improved spaces and a recreated tropical rain forest. Following final detailing and engineering, NMNH/MOM hopes to begin construction in 1990 and to open the new hall in 1991.
- Minerals and Gems: With the best collection of its kind in the world, NMNH/MOM intends to completely redevelop the Gems and Minerals Hall to incorporate new world-class pieces and to present related scientific information in exciting, dynamic, and highly educational formats.
- Human Origins: Still in the early days of planning and design, the Museum's Human Origins Hall will present the physical and cultural characteristics that define what it means to be human and the scientific means and analyses by which these determinations are made.
- Marine Mammals Hall: A major renovation of the existing Marine Mammals Hall will feature a new script, graphics, models, and other interpretive materials. A balcony overlooking the spectacular 92-foot model of the now-endangered Blue Whale will be renovated and reopened.

Highlights of 1989 special exhibitions include:

- "Crossroads of Continents: Cultures of Siberia and Alaska": This major international exhibition was on view in the Museum's Thomas M. Evans Gallery for five months in 1988-89. Developed jointly by the Museum and the Soviet Academy of Sciences, with the collaborative aid of the International Research and Exchange Board, the exhibition marked the first time that the people of both continents have had the opportunity to view many early and important archeological and ethnographic collections from the remote but important North Pacific region. The exhibition will be seen in five other museums in the United States and Canada, as well as in Moscow, Leningrad, and two additional Soviet cities. NMNH/MOM scholars edited a 360-page catalogue, with contributions from Soviet and American scholars, that was published by the Smithsonian Institution Press. A "Crossroads" school packet and film program accompanied the exhibition.
- "Coyote: A Myth in the Making": This ten-year retrospective of native-American artist Harry Fonseca's "Coyote" art was organized and circulated by the Natural History Museum of Los Angeles County. It featured works showing Fonseca's vision of Coyote, a magical being prominent in the traditional literature and religious beliefs of many native peoples of the Americas.

- "Flowers from the Royal Gardens of Kew: Two Centuries of Curtis's Botanical Magazine": This exhibition featured 70 watercolors, dating from the 18th to 20th centuries, by renowned botanical illustrators. Currently on a nationwide tour, it was organized by the Royal Botanical Gardens, Kew (London, England), to celebrate the 200th anniversary of the magazine.
- "Inside Active Volcanoes: Kilauea and Mount St. Helens": This major exhibition on the two active volcanoes in the United States opened at the Museum in July 1989. It was developed by a NMNH/MOM volcanologist in cooperation with a U.S. Geological Survey colleague. Following its three-month stay in Washington, it will travel nationally to 11 cities under the auspices of the Smithsonian Institution Traveling Exhibition Service (SITES). Featuring spectacular color photo murals and film sequences, the exhibition captures the power and beauty of the eruptions of Kilauea and Mount St. Helens. Touchable geological specimens and numerous interactive computer displays provide visitors with hands-on information about volcanoes and their activity. One highlight is a computer display that presents seismic activity on Hawaii Island as it happens. Linked by telephone to the Hawaii Volcano Observatory computer, the display dramatically shows that the island is one of the most seismically active places on Earth.

Education: Relying on nearly 300 docents who volunteer to provide educational services, the Museum's Office of Education produces programs and develops instructional materials to accompany Museum exhibits. Forty thousand schoolchildren came through NMNH/MOM for special programs in 1988. Special facilities include the Discovery Room, a nationally known hands-on facility for children, which welcomed more than 100,000 visitors last year; the Naturalist Center, where natural history objects, books, and equipment for visitors aged 12 and older are available; and the live Insect Zoo. Nearly 20,000 people attended the Museum's Friday Film and Lecture Series and other special educational programs presented free throughout the year.

Among the special activities in 1989 was a new outreach program to the fast-growing Southeast Asian community in the Washington, D.C., area. It featured traditional music and dance of Vietnam, Laos, Cambodia, and Thailand. In conjunction with the "Crossroads" exhibition, a free film festival showed recent Soviet films on the Siberian people and rare, early footage from Smithsonian and Finnish archives on the people of northern Alaska and Siberia. The first troupe of musicians and dancers from northeastern Siberia ever to appear in the United States presented free programs of music, dance, storytelling, and crafts.

NMNH/MOM is currently planning "Natural History Update," a weekly natural history video program for continuous viewing in the Museum. Put together by a small in-house staff, these innovative large-screen video programs will feature short, up-to-date looks at Museum research and current natural history events to complement traditional museum displays. The objective is to excite public interest in new scientific findings and acquisitions as well as current newsworthy events, such as earthquakes, volcanic eruptions, oil spills, or forest fires. Drawing on still photographs and film clips from news media and filmed interviews with scientists, the videos will provide deeper insights into current issues than is possible in television broadcasts. With environmental changes influencing the world at an increasing rate, traditional exhibitions, which take years to produce, cannot keep pace with the evolving Earth and new research advances. "Natural History Update," portraying up-to-date natural history events, will be an important adjunct in the educational purpose of the display halls.

In conjunction with plans to modernize the Museum's Native-American Halls, the Museum initiated a new series of public programs in July 1989 that bring to the Museum practitioners from tribes throughout the United States and Canada of traditions such as pottery, storytelling, songs and dances, weaving and basketry, jewelry-making and silversmithing. These public programs and demonstrations by contemporary native Americans and Alaskans provide a unique opportunity for Museum visitors to interact with representatives of a living cultural heritage.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, NMNH/MOM requests 35 workyears and \$3,174,000 to support an associate director for public programs (2 workyears and \$115,000); address facilities, safety, and administrative infrastructure needs (3 workyears and \$176,000); document native-American collections (3 workyears and \$129,000); support major exhibit hall renovations (1 workyear and \$1,000,000); support public affairs and institutional advancement initiatives (4 workyears and \$136,000); support the Columbus Quincentenary exhibition (1 workyear and \$100,000); support the Collections Information System (1 workyear and \$300,000); establish a computer and communications equipment base (\$200,000); support collections management activities (\$50,000); support basic research infrastructure needs (7 workyears and \$193,000); increase base support for the new Laboratory for Molecular Systematics (2 workyears and \$200,000); support Human Ecological History research (4 workyears and \$200,000); support the Amazonia Biological Diversity Program (3 workyears and \$145,000); and to support Evolution of Ecosystems research (4 workyears and \$230,000).

Associate Director for Public Programs (2 workyears and \$115,000) - As the most popular natural history museum in the world, NMNH/MOM has a special responsibility to enhance visitors' knowledge of the natural world, the diversity of human culture, and the ways human activities impinge on natural processes. The goal of coordinating the efforts of the offices of education and exhibits under one associate director is to create a national model for public education in the natural sciences and anthropology that will build on the strengths of the Museum's collections and research interests and the size and diversity of the Museum's audience.

The primary responsibility of this position is to integrate and strengthen NMNH/MOM exhibits and educational programs to enhance the total visitor experience. As the Museum moves from static display techniques to interactive exhibits and education, improved coordination of these traditionally parallel efforts is vital. This request will fund an associate director (1 workyear and \$89,000) and secretarial support (1 workyear and \$26,000). Base resources will fund travel and other support requirements.

NMNH/MOM audience consists of more than seven million visitors each year from around the world, including local schools, colleges and minority groups. By hiring a senior manager to coordinate public outreach efforts, the Museum will meet the needs of its constituency more efficiently.

Facilities, Safety, and Administrative Infrastructure (3 workyears and \$176,000) - NMNH/MOM is an active partner with the central Smithsonian Facilities Services units in meeting the physical plant needs of the Institution. The Museum's specific responsibilities include the Natural History Building, the Museum Support Center, and portions of the Silver Hill Facility and Smithsonian Institution Service Center. The backlog of building repairs and the need for improved preventive maintenance, short-term and long-term facilities planning, updating of exhibits, research, and collection management spaces require effective contributions from the Museum.

The facilities and safety enhancement request will help the Museum respond to pressing needs relating to physical plant issues. Factors creating this need include:

- the age of the physical plants, which necessitates ever-increasing attention, particularly the Natural History Building, a portion of which is 80 years old;
- the Institution's already successful initiatives to increase funding for the central Smithsonian Facilities Services units;
- the requirement for additional action in response to the Institution's expanded internal audits program;
- the Museum's recently funded and projected programmatic initiatives requiring both short-term and long-term space planning and changes in the physical plant, including facilities for new programs and changing research technologies, exhibits renovations, and improved environments for the collections.

Two facility operational program assistants (2 workyears and \$84,000) will serve as support for the two existing senior staff. The duties of these program assistants will include:

- a broad range of physical plant-related management activities, including physical plant repair, renovation, alteration, and construction programs;
- use of the computer to provide space planning and layout design for both short-term and long-term needs;
- safety and security of staff, visitors, collections, and other property;
- building services, including custodial and labor activities.

One program assistant will act on daily operational issues involving safety, security, and small renovation projects, while the other program assistant will serve to aid in space monitoring and planning for long-term projects.

Funding of \$66,000 will provide contractual services (\$20,000); supplies and equipment to provide for additional safety and building services; supplies for programming support; and equipment including enhanced computer hardware, software, and communications for space documentation, planning, and monitoring purposes (\$46,000).

The request for administrative infrastructure support will alleviate a severe shortfall in the fund management aspects of accounting for NMNH/MOM funds. The Museum manages almost 600 different Federal and Trust accounts in 25 departments and units, totaling more than \$30 million. NMNH/MOM requires increased resources to manage these funds properly, and to reconcile Museum records with central accounting records in a timely fashion. In order to keep pace with expanding programs and to exercise more effective controls of resources, the bureaus have an expanded responsibility to monitor financial records. These new responsibilities have added a significant workload to the Museum, for which no additional support is available. The Museum is unable to provide additional resources for this support without negatively affecting other major program activities.

One administrative technician (1 workyear and \$26,000) will carry out fund management support activities in the Office of Exhibits. Tasks will include data entry of obligations into the Museum's automated fund management system, reconciliation of monthly accounting reports, and processing small purchase orders. Without this position, the Museum will not be able to maintain proper financial control over existing funds.

The requested funds will assist NMNH/MOM in meeting its management responsibilities for the physical plant needs in its various facilities and will ensure essential funds control.

Native-American Collections Documentation for Repatriation (3 workyears and \$129,000) - The NMNH/MOM Native-American Collections Documentation Project will increase the Institution's ability to make informed and timely decisions in response to reburial and repatriation requests of native-American peoples. Each request may result in an irrevocable deaccession decision. The project ensures that the Museum will thoroughly understand and consider fully all relevant cultural and scientific issues.

The Project responds to native-American peoples' increasing interest in access to collections relating to their own tribal heritage. With this funding, NMNH/MOM will:

- establish provenance of native-American collections, including evidence linking collection items to known tribal groups and determining the legal and ethical circumstances surrounding the Smithsonian's collection and/or acquisition of those items;
- comprehend the cultural attitudes toward such material both at the time of collection and at the present time;
- evaluate the present and potential scientific importance of the involved collections;
- review and make informed decisions on deaccessioning collection items;
- analyze and document, for the benefit of future study, items the Museum will deaccession.

To conduct these activities, the Museum will hire two specialists to respond to specific repatriation and reburial requests and one technical assistant to provide data entry and other support services for the program (3 workyears and \$97,000). With the remaining funds, the Museum will purchase computer and microfilm equipment for the Project (\$32,000). The Museum may require additional resources in future years to meet the growing interests of native Americans in the National Collections.

The native-American collections of NMNH/MOM are of enormous interest to the native-American peoples. Documentation of the historical and cultural origin of the collections is crucial. The Native-American Collections Documentation Project will ensure the Institution's responsiveness to reburial and repatriation requests of tribal communities.

Major Exhibit Hall Renovation (1 workyear and \$1,000,000) - NMNH/MOM has 30 permanent exhibit halls comprising more than 200,000 square feet of exhibit space. Most of these halls are more than 20 years old and present outdated cultural

interpretation and scientific information to the public. The Museum is committed to bringing the exhibits up to date, to making the Museum again a leader among the U.S. and world museums, and to facing the serious challenge of science education.

The request will enable the NMNH/MOM to continue work on The Fourth Generation of Exhibits--building for the 21st century a long-term renovation plan for its 30 permanent halls. The staff and funds provided by this request will allow continuous upgrading, renovation, and maintenance services to assure the quality and improve the appearance of exhibits and public spaces, the care and conservation of national collections on display, and the safety and comfort of more than seven million visitors per year.

Existing salary and expenses resources and repair and restoration limits will not permit timely renovation of major exhibit halls. Ideally, the renovation should occur at an average rate of one and one-half halls per year, at an estimated mean cost of \$4.0 million per hall. Scheduling for exhibit construction is, whenever possible, in concert with repair and restoration, major capital renewal, and Museum Support Center move activities.

Careful planning is essential for exhibit renovation, often requiring scheduling several years in advance for demolition, object selection and preparation, and installation. Because of current restrictions on specific funding, monies come from a variety of sources to pay for exhibit reinstallation. This further delays production. Because of the magnitude of the costs involved in exhibit revitalization and the requirement of multi-year planning, the Museum requests that this funding (\$1,000,000) for major hall renovation remain available until expended. This is unlike the remainder of the salaries and expenses appropriation for this line-item which is a one-year appropriation. The "Highlights" section of this budget contains a further justification for no-year funding.

For FY 1991, these funds will support one conservator (1 workyear and \$46,000) and support costs to renovate one major exhibit hall per year. The Museum will begin renovation of the Native American Hall and rebuilding of the Insect Zoo, Marine Mammals Hall balcony, and the Gems and Minerals Hall.

The ultimate goal is to renovate all the exhibit halls in NMNH/MOM. The following are the component pieces of a typical \$4.0 million budget for a hall measuring approximately 10,000 square feet in size: design costs, \$750,000; demolition, \$75,000; mechanical and safety, including electrical and sprinkler equipment, \$185,000; walls, ceiling, and lighting, \$250,000; exhibit casework, case lighting, headers, and panels, \$1,800,000; casework installation, \$270,000; installation of graphic elements, brackets, dioramas, specimens and artifacts, \$325,000; audiovisual and installation, \$185,000; carpet and installation, \$60,000; and publicity and public programming, \$100,000.

The modernized halls of the National Museum of Natural History/Museum of Man will display to millions of visitors landscapes and seascapes, living and extinct organisms, and the human cultures of the Earth. The Museum strives to complete its hall renovation in order that its visitors might better understand the beauties and complexities of the living planet.

Public Affairs and Institutional Advancement Infrastructure (4 workyears and \$136,000) - Increasing the public's knowledge of activities through support of public affairs and events is a unique way to focus on world issues and to supplement the

teaching of science and the understanding of different cultures in the Nation's schools. Press releases, a Natural History Update bulletin, media placement, and lectures by the Museum's leading scientists bring critical issues affecting our world to the public's attention.

The Kinsey and Company management study conducted in 1987 strongly recommended that the Museum strengthen public affairs efforts. Increased activity in exhibit renovation, scheduling of events in the Museum's Baird Auditorium and learning center classrooms, and related activities demand that the Museum expand special events staffing. Without additional resources, NMNH/MOM will be able to make only a minor effort in the area of public affairs. The requested staff will assist NMNH/MOM's public information officer and special events coordinator. NMNH/MOM's staff will then be comparable in size to other successful Smithsonian museums' programs in support of public affairs activities.

A public relations specialist (1 workyear and \$38,000) and a production assistant (1 workyear and \$26,000) will support public affairs initiatives in general. A science writer-editor (1 workyear and \$46,000) will support the new Natural History Update bulletin. A special events assistant (1 workyear and \$26,000) will schedule and plan for exhibit openings, special tours, receptions, and events for visiting dignitaries. The Museum will seek additional resources to support costs associated with these activities, such as the publication and distribution of the bulletin.

By increasing resources to support public affairs activities at the Museum, a greater number of people will come to know about the work being done by the largest group of Smithsonian scientists and scholars and to be more aware of the human and natural environment.

Columbus Quincentenary Exhibition (1 workyear and \$100,000) - NMNH/MOM's Columbus Quincentenary contribution will be a 13,000 square-foot major exhibition, "Seeds of Change." Opening October 12, 1991, the exhibition will remain on view for a minimum of 13 months, through the celebration year of 1992. Through its exhibitions, programs, symposia, and publications, "Seeds of Change" will provide an ideal forum for acknowledging and presenting the changes in the Americas after 1492. This story encompasses the full range of the natural sciences. The exhibition's impact and value will last far beyond the Quincentenary commemoration.

In FY 1991, the Museum will distribute printed educational materials, including a set of six posters on the "Seeds of Change" exhibit, two teacher's guides, and student activity books. Participants contributing to the development of these materials include the National Council for the Social Studies, the National Science Teachers Association, the American Library Association, and the Federation for the State Humanities Councils. This same group working with the Museum and SITES will produce a panel version of the exhibition for distribution to 60 public libraries in all 50 States and three territories. With SITES's assistance, the Museum will also complete production of a core "Seeds of Change" exhibition to be used and built upon by six major museums throughout the United States, including the new Fernbank Museum of Natural History in Atlanta. As a result of this combined effort, the exhibition will reach out to more than 16 million Museum visitors, 150,000 teachers, and 45,000 librarians, and through them, their constituents nationwide.

The Museum currently has a base of 1 workyear and \$130,000 for its Quincentenary programs. The requested increase will support a registrar (1 workyear and \$26,000) who will handle loan, shipment, and care for all specimens in the exhibition and

assist in the completion of exhibit and education materials. The balance of the requested increase will support exhibit production costs including original murals, dioramas, models, two audio-visual presentations, and an interactive video. The fabricators will complete production in FY 1991 and installation will begin in late summer 1991.

NMNH/MOM's high-quality exhibition will touch on the lives and lifestyles, as well as contributions and experiences of native Americans, African Americans, and Hispanic Americans and be of interest to all the peoples of the Americas. The Museum's program will join all natural sciences to produce one major effort for this historic commemoration.

Collections Information System (1 workyear and \$300,000) - Development of a modern Collections Information System (CIS) will guarantee inventory control and expanded scholarly access to the large and growing National Collections of NMNH/MOM. Every year more than 2,000 visiting scholars, 240 resident researchers, affiliated scientists, and fellows access collections information. In addition, the Museum's loan program is one of the most active among the museums of the world.

The Museum loans and exchanges an average of 300,000 specimens every year, and a range of pertinent information follows these loans and exchanges. A modern Collections Information System will ensure that the Museum meets the increasing demands for access to collection records and maintains better inventory control over its 119 million items.

In late FY 1987, the Museum successfully completed a prototype for the data retrieval component of CIS. Since that time, the Museum has converted approximately one million records from the Institution's antiquated, 20-year-old system into the new data retrieval component of CIS. This conversion permits faster retrieval of information (seconds or minutes rather than a week in the batch-processing mode) and immediate updating of records while it ensures greater accuracy of data.

Conversion work is a multi-year effort. The requested funding will permit the Museum to initiate the second phase of CIS development. This phase will support documentation of collection transactions such as loans, exchanges, and accessions and generation of automated loan invoices and other management documents. Most of these activities use manual systems at present. With the requested funding, the Museum will contract with data base designers and purchase necessary computer software (\$254,000). It will also hire a system administrator (1 workyear and \$46,000) to control system operations such as security management, system backups, modifications and documentation, and performance monitoring. The Museum requires continued support for full system design and maintenance.

Development of CIS is an Institutional priority. The system supports the work of NMNH's registrar, collections managers, shipping officers, and exhibits staff. Completing this second component of the system will increase efficiency in collection transaction processing, improve inventory control over the National Collections, and facilitate scholarly research.

Computer and Communications Equipment Replacement Program (\$200,000) - The Museum uses more than 400 personal computers and other automation equipment for research, collections management, public programs, and administrative functions. Yet there are no base funds for computer equipment replacement. The continued lack of adequate

state-of-the-art computer capability will have a crippling effect on the Museum's research and daily operations.

Since computer equipment becomes obsolete in five to seven years, the Museum requires a base of \$200,000 to establish a Computer Equipment Replacement Fund to replace a portion of the machines each year. By FY 1991, equipment originally purchased for more than \$1.4 million will be at least five years old. The Museum must replace its older equipment at a faster pace in order to maintain a healthy computing environment. Part of the replacement strategy is to buy more powerful machines for researchers and shift their older machines to functions where less power is needed.

The program will also provide funds to upgrade the Museum's heavily used data communications equipment to a high-speed computer network. The current communications system, which allows personal computers to tie into host computers, is used by more than 200 people each day to send electronic mail, to operate an internal funds management system, to analyze research data on central computers, to use the Collections Information System, and for other purposes. This communications system does not, however, provide the high speed and capabilities of computer networks. The Museum needs a full network in order to implement modern, efficient systems for collections, research, and office automation functions and to exchange information with networks in other museums and administrative offices.

Currently, the Museum purchases most computer equipment with funds provided for special projects. The requested \$200,000 will help build the Museum's ability to buy replacement equipment when needed. NMNH/MOM will use up to \$75,000 per year from the new computer equipment replacement fund to upgrade the communications system to full network capability by FY 1995.

Maintaining modern computing capabilities enables the Museum to continue vital research projects, to develop and implement the Collections Information System, and to improve administrative systems for financial and personnel management.

Collections Management Support (\$50,000) - Increased collections management support will enhance the Museum's ability to fulfill its fundamental responsibility of providing access and care of the National Collections. Both the international research community and the public benefit from improvement in these areas.

With the requested funding, the Museum will make significant improvements to important segments of the NMNH/MOM collections. The Museum will process and evaluate the collections, upgrade documentation procedures, improve the physical care of the collections, and maintain accountability. Museum staff will cull and deaccession specimens where appropriate.

Large portions of the natural history collections are without staff research curator care. Rather than increasing permanent curatorial staff, the requested funding will provide short-term contractual support to contract for the services of specialists to improve collections specifically not covered by staff expertise.

This request will enhance the ability of the Institution to fulfill its trust responsibility to the public. It will provide the necessary resources for short-term projects aimed at providing better intellectual access to and care of NMNH/MOM collections.

Basic Research Support Infrastructure (7 workyears and \$193,000) - NMNH/MOM is the largest Smithsonian bureau with a staff dedicated to fundamental research, such as determining existing species diversity before they are irrevocably lost, studying human origins, and investigating the origins of the solar system. As a part of this effort, there is also a growing need for statistical analyses.

A study conducted in 1987 indicated that of all the technical support staff, only 49 workyears (approximately one-half of a workyear per scientist) were devoted to research support. Few of the Museum's 114 Federal scientists currently have full-time research support, while many have no support at all. Over the past several years, the Museum has attempted to provide at least half-time support as new scientists are hired.

The addition of six research assistants (6 workyears and \$141,000) will support curatorial research efforts both in direct research (as trained biologists and anthropologists) and in collections management. These research assistants will provide at least half-time support for up to 12 scientists presently without such assistance. Their work will lead to improved curation of the National Collections and increased effectiveness of research programs. This minimal level of support for scientific staff will maximize productivity in scholarly research.

Statistical analysis is an increasingly vital research tool, the use of which must be guided by a support staff of professional statisticians. The Museum will hire one mathematician (1 workyear and \$21,000) and will buy computer equipment and accessories (\$31,000) to supply critical statistical support to Smithsonian researchers. The requested increase will provide for a basic level of statistical support services.

The productivity of the Museum's scientists is proportionate to available technical support. This basic infrastructure increase is absolutely essential if NMNH/MOM is to continue to play a viable role in today's exciting scientific scene.

Laboratory for Molecular Systematics (2 workyears and \$200,000) - The advent of molecular technology is the most significant new development for systematics research in decades. The Laboratory for Molecular Systematics uses recombinant DNA methods to trace the relationships and evolutionary history of living organisms. As evolution is essentially a process of genetic change and diversification, molecular genetic methods can give direct access to information about evolutionary change. This information provides a powerful new tool for analyzing the relationships between organisms and the mechanisms of diversification.

First-rate research capability in molecular systematics at NMNH/MOM is essential if the Museum is to maintain its role as a world leader in systematics research. This request will provide funds for the continued growth of the new laboratory in this rapidly developing field.

Established in 1988, the laboratory will be fully staffed by 1993 through a well-paced plan for scheduled increases in staff and budget. For the laboratory to reach its full potential for self-sustaining, productive research, the Museum must staff it with well-trained scientists and modern equipment. Substantial cuts in yearly increases during the growth phase would seriously jeopardize that goal.

The current request includes a scientist and a technician (2 workyears and \$78,000) and equipment, supplies, and other services (\$122,000). The scientist will

develop a research program to apply new molecular genetic technology to problems in systematics biology and natural history. The technician will assist the scientist in this research. The scientist will also have a joint appointment in one of the existing departments of the Museum, dictated by their research interests.

The Laboratory for Molecular Systematics represents a bold step for NMNH, as it is the first commitment by a major natural history museum to take full advantage of recombinant DNA technology for systematics research. Recombinant DNA technology has revolutionized every field of biological inquiry. The Museum's laboratory will play a major role in keeping NMNH/MOM at the forefront of systematics research now and in the future and in enhancing the Museum's ability to accomplish its mission of increasing and promulgating knowledge of natural history.

Human Ecological History (4 workyears and \$200,000) - Expanding threats to the environment compel scientists to assess the long history of human impact on world ecosystems. Understanding humankind's ecological history is necessary to plan for the future. With increased funds, NMNH/MOM will strengthen an innovative research effort to understand long-term human modification of ecosystems and responses to changing environments. Museum scientists will lead Human Ecological History (HEH), an international program to document major shifts in human ecosystems from human origins more than a million years ago up through the agricultural revolution to the present day.

International scientific cooperation is a cornerstone of this program. The Smithsonian has forged strong bonds with research organizations in East Africa, the Near East, and Asia. Collaborative fieldwork in East Africa, especially Kenya, will focus on the behavior and ecological interactions of early humans in the face of changing tropical environments over the past five million years. NMNH/MOM scientists will learn how ancient man used his landscape by analyzing the tools, animal remains, and environmental clues excavated in Kenya. Museum researchers will engage in comparative studies relating the evidence of ancient environments and associated human activities and impacts as humans expanded geographically from Africa across the world. Major shifts along this long history of human expansion and increasing ecological influence are still poorly understood.

Modern agriculture increasingly affects ecosystems and reduces biological diversity worldwide. Field and laboratory research helps to explain the origins, intensification, and impact of past agricultural systems in different world areas. Scientists will analyze plant and animal remains to construct a rich and detailed record of the development of agriculture and its environmental consequences. Historical and field research on modern Kenyan groups conducted by Museum scientists will document how present communities cause and respond to large-scale environmental and social change.

The requested funding will support four positions (4 workyears and \$148,000). A professional archeozoologist and a laboratory specialist will establish a permanent laboratory for analyzing archeological animal and plant remains. Their work will be supported by a research laboratory specialist and an information specialist. This funding will also cover the costs of field research and equipment (\$18,000), travel (\$29,000), and logistical support for research teams (\$7,000). In future years, the program will include outreach and training to disseminate findings to both the scientific community and the public through seminars, exhibitions, fellowships, and intern programs.

Human Ecological History will integrate a variety of new research technologies with anthropological, biological, and geological research in NMNH/MOM and collaborating institutions in an unprecedented manner. HEH's emphasis on the ecological context of human biological and cultural evolution complements the Museum's other new interdisciplinary programs in Biological Diversity, Evolution of Ecosystems, and Molecular Systematics.

Amazonia Biological Diversity Program (3 workyears and \$145,000) - The loss of tropical rain forests and concomitant biodiversity is a threat to all mankind, particularly as it relates to hastening global warming and other changes. There is no time to delay in addressing these urgent and ultimate problems no matter how modest the initial effort. Tropical forests, especially in Brazil, are disappearing at an alarming rate, and it is in the interest of the United States and the world community to help prevent this destruction.

The requested increase will strengthen and expand the Museum's research and training efforts in tropical biodiversity, enfolded within it the existing programs in Bolivia and Peru (Biological Diversity in Latin America, or BIOLAT) and in the Guianas. Other organizations such as the World Wildlife Fund also sponsor research at sites in Brazil and the Smithsonian will coordinate its efforts accordingly. The Museum may expand its efforts to include additional permanent sites in Ecuador. The proposed expansion will significantly increase sampling validity of the Museum's ongoing biodiversity research in South America. The intended result will explain the diversity and dynamics of tropical forests, suggest ways to minimize forest fragmentation and loss, and clarify the effects of such deforestation.

Funds will support a program director (1 workyear and \$76,000) for all the Amazonia Biological Diversity Program initiatives. An administrative technician (1 workyear and \$26,000) will assume responsibility for day-to-day support, such as secretarial, procurement, and fund management activities, for the program director. Scientific participants in the programs will spend up to four weeks in the field in South America and will require food, shelter, and logistical and research support. A field manager (1 workyear and \$38,000) for one of the sites will provide vital support for these needs. The balance of funds requested in FY 1991 will provide for start-up computer equipment (\$5,000). In subsequent years, the Museum will seek additional funds for travel, publications, supplies, and logistical support.

NMNH/MOM's tropical diversity programs are intricate and varied and represent some of the most important and visible investigations being conducted today. It is of utmost importance to provide dynamic intellectual leadership to sustain their excellence.

Evolution of Ecosystems (4 workyears and \$230,000) - Modern ecosystems are the result of many natural "experiments" through time. Through studies on the evolution of terrestrial, marine, and island ecosystems, NMNH/MOM staff seek to understand the evolution of these biotas, their response to past environmental crises, and the ways that species achieve diversity, distribute themselves, and adapt. The three separate but complementary components of the proposed Evolution of Ecosystems Program are:

-- Evolution of Terrestrial Ecosystems (ETE) (1 workyear and \$97,000). The requested resources will enable increased field and laboratory study to assemble a data base on terrestrial ecosystems extinct for 400 million years. ETE researchers are taking a leading role in studying how ancient ecosystems responded to climate change. Research includes "greenhouse" climates of the Cretaceous period, which

existed about 100 million years ago. Understanding ecological responses to past greenhouse climates could enable scientists to predict the consequences of such phenomena today.

Under the leadership of four curators from the Departments of Paleobiology and Anthropology, the Museum is documenting and statistically analyzing the fossil record of terrestrial animal and plant communities. Research concentrates on the intervals before and after extinctions and before the emergence of human influences. With a data base structure designed in FY 1988, major data acquisition has begun. The Museum's Terrestrial Ecosystems through Time, based on the 1987 workshop conference involving many scientists from other institutions, establishes the status and future goals of terrestrial ecosystems research. By FY 1990, ETE will expand its role in this research by engaging in new field and laboratory projects.

The requested funds will allow the Museum to hire a museum technician (\$26,000) to help with field and laboratory tasks. These funds will also enable present curatorial staff to undertake field projects (\$8,000 for additional travel) and other activities to fill specific needs of the ETE data base. The requested funds will pay for workshops and the assistance of outside researchers who can contribute to the data base (\$33,000). Funds for equipment (\$23,000) will finance additional work stations, service contracts, student internships, and other activities for the ETE curators. Additional support will fund transporting objects from the field, communications, printing and reproduction, and supplies (\$7,000).

The certainty that mankind eventually will face the consequences of large-scale ecological catastrophes, either natural or manmade, makes it essential to understand the history of terrestrial ecosystems and how they have responded to major changes in the past.

-- Evolution of Marine Ecosystems (1 workyear and \$50,000): Many of today's coastal marine ecosystems appear particularly endangered, as evidenced by the death of many dolphins in 1987 and the closing of many fishing areas. This program will study the causes of previous mass marine extinctions. Studies will also focus on the cause of changes in marine populations that led to present-day diversity. The goal of the program is to determine from fossil records what distinguishes successful from unsuccessful marine communities and to compare them with present-day ecosystems.

The requested funding will support two areas of study: comparison of selected modern biotic communities with similar fossil communities and examination of the large NMNH/MOM data base for clues of evolutionary success and failure. The Museum will hire a scientist (1 workyear and \$38,000) to initiate the proposed studies. Other requested funds will support computers and accessories to analyze and add to the existing data base (\$12,000).

NMNH/MOM has the largest group of multi-disciplinary specialists in the world working on paleobiological and modern biological problems. It may, in fact, be the only institution where such a cooperative venture can be accomplished. Studies on mass marine extinctions must continue and expand. With the death of the seas, the death of the planet is certain to follow.

-- Evolution of Island Ecosystems (2 workyears and \$83,000): Smithsonian scientists are studying little-known mass extinctions of birds and other animals that swept the world's isolated islands well after the end of the last ice age. An urgent need exists to locate and preserve fossils from these areas before they are destroyed

by the encroaching human population. This fossil extinction event is important to understand since the extinction may be related to prehistoric human activities.

Smithsonian scientists are tracing this wave of destruction through the Atlantic, Indian, and Pacific Oceans. They are discovering extinct life forms, including more than 40 unique kinds of birds from Hawaii alone. These discoveries are scientifically important because they call into question earlier studies that played a prominent role in formulating modern theories in ecology, evolutionary biology, and conservation.

This multi-disciplinary research involves the collaboration of specialists in the fields of paleontology, archeology, palynology, and radiometric dating. The Smithsonian is the acknowledged leader in this area of research. NMNH/MOM's knowledgeable staff and extensive skeletal collections, particularly of birds, which researchers use to identify the fossils they collect, make it the only institution that can conduct the program.

The funds requested will provide for two museum technicians/research assistants (2 workyears and \$52,000) to process new fossil collections and help prepare scientific publications. The remaining funds will support field research costs, shipping, contractual support, supplies, and equipment (\$31,000).

This program will provide new scientific data on biodiversity that the Museum may apply to problems of conservation and resource management. Many unique fossils that might otherwise be destroyed will be preserved as part of Smithsonian's collections. These data and collections are essential to scientific understanding of the evolution of island faunas and island diversity, knowledge that has played a prominent role in evolutionary theory since the time of Charles Darwin.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - The Museum derives funds from a variety of sources. These funds represent the Museum's share of net proceeds of the museum shop, cafeterias, vending machines, and other receipts, such as sale of educational posters and folios; royalties from staff publications through the Smithsonian Institution Press; and tuition reimbursement grants by universities for courses taught by Museum staff members. During FY 1989, allotments provided for the costs of the Museum director and a support staff member, half-time administrative support for the Marine Systems Laboratory, a computer statistician to support Museum researchers, and events related to new exhibit openings.

Special purpose funds are used in the support of special research publications, field research, Museum internships and fellowships, travel and supplemental training for support staff, collections acquisition, NMNH/MOM brochures and audio-visual equipment for exhibit halls, and other needs of the Museum's various departments. The Museum's Naturalist Center and Discovery Room also receive support for educational supplies, specimens, furnishings, and related materials.

NMNH/MOM benefits from the Institution's programs for Collections Acquisition, Scholarly Studies, Educational Outreach, Research Opportunities, the Women's Committee of the Smithsonian Associates, Smithsonian Society, International Exchange, and Special Exhibition funding initiatives for research, education, and exhibit projects. Funding for FY 1989 has provided for wider audience participation initiatives, support to produce a Kiowa catalogue, research for a Human Origins Hall, support for the Columbus Quincentenary exhibition "Seeds of Change," and the design for a new Insect Zoo.

Restricted Funds - The Museum receives additional funding for specific programs and projects through endowments, donations, gifts, grants, and contracts from individuals, foundations, corporations, and Federal agencies. Some of the sources of this type of funding are ARCO Gas and Oil Company, Earthwatch, and Exxon Corporation. In combination with the generosity of private individuals, these resources allow for the pursuit of many long-term and short-term research projects and exhibits. One example of this type of funding is gifts totaling more than \$700,000 from members of the American Mining Congress, designated for the renovation of the Gem Hall. Another example is support from Space Biospheres Venture (SBV) for the Marine Systems Laboratory Biosphere Project. The intent of this project is to provide food sources and a livable human habitat to sustain life during space travel, through the development of seven major ecosystems. The prototype for this project is presently in the construction stages in Tucson, Arizona.

During FY 1989 Museum staff members conducted a variety of projects with restricted funds, including ethnographic research of Tobelorese communities of Indonesia, study of Arenal Volcano in Costa Rica, and investigation of powder X-ray diffraction of manganese oxide materials. These are but a few examples of activities carried out in the Museum and at field sites around the world.

NMNH/MOM is responsible for the management of the Smithsonian Marine Research Station at Link Port (SMSLP), Fort Pierce, Florida. Hunterdon Endowment funds are dedicated to the basic operation support of this oceanographic research facility, the research of one resident scientist, and supporting research activities of Smithsonian visiting scientists from NMNH/MOM and the Smithsonian Environmental Research Center, postdoctoral fellows, and numerous visiting investigators, both national and international. Research focuses on the life history, systematics, and ecology of a wide spectrum of plant and animal marine life. Seward Johnson Endowment funds provide for the support of the Johnson-Sea-Link submersible owned by the Harbor Branch Oceanographic Institution (HBOI), the host facility.

NMNH/MOM is currently developing a fund-raising strategy to support construction of a laboratory and residential facilities that will serve the mission of SMSLP and its research initiatives. Since the Museum's involvement with the SMSLP, its location has proven to be a growing source of study for virtually all scientific disciplines. These considerations, along with the advent of long-term lease agreements between the Smithsonian and HBOI, have made this major step forward possible.

Government Grants and Contracts - These funds are provided by various government agencies and departments for special projects conducted at the Museum to take advantage of its unique scientific expertise and variety of specialty fields. Examples of this type of activity are analysis of polar biological materials and cooperative systematics studies by the Smithsonian Oceanographic Sorting Center (SOSC) for the National Science Foundation; biosystematic research by an entomologist located at the Museum Support Center on Aedes mosquitoes for the U.S. Army; and tumor registry in lower animals, conducted by the Department of Invertebrate Zoology for the National Institutes of Health. Other agencies currently contracted with NMNH/MOM departments are the National Air and Space Administration, the U.S. Information Agency, the Department of Agriculture, the Department of Interior, and the National Oceanic and Atmospheric Administration.

NATIONAL AIR AND SPACE MUSEUM

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	215	9,552	3	261	45	4,183	2	937	5	298
FY 1990 Estimate	216	9,904	3	251	46	4,412	3	1,557	5	304
FY 1991 Estimate	220	10,091	3	249	46	4,594	4	1,666	4	242

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Air and Space Museum (NASM) is an international repository for artifacts and documentation related to the development of aviation, space flight, and space science. Through its exhibitions, research, collections management, and education programs, the Museum serves a wide public and scholarly community interested in the history and technological achievements of aviation and space flight. In addition to its Mall location, NASM maintains a facility for the preservation and restoration of artifacts at the Paul E. Garber Preservation, Restoration, and Storage Facility in Suitland, Maryland.

For FY 1991, NASM requests an increase of 4 workyears and \$187,000 for a museum curator for military history (1 workyear and \$50,000); a museum specialist for restoration (1 workyear and \$38,000); a remote-sensing scientist (1 workyear and \$50,000); a computer specialist for interactive displays (1 workyear and \$40,000); and preparation of a world atlas of satellite images (\$9,000).

PROGRAM - Legislation established NASM on August 12, 1946. The completion of the Mall Museum in 1976 greatly strengthened NASM's role as a national resource for public and scholarly interest in the history of air and space technology. More than 121 million people have visited the Museum since it opened, making it the most popular museum in the world. NASM's collections include more than 300 historic aircraft, 250 spacecraft, and extensive holdings of artifacts, papers, photographs, films, microfiche, video disc, and technical drawings. These resources are available for interested American and foreign scholars to study.

The exhibition program uses state-of-the-art techniques in design, presentation, and equipment to convey the excitement of the subject matter to the visitor. Active scientific research programs, aimed at understanding astrophysics and both terrestrial and planetary geology, are important endeavors of the Museum. Ongoing programs in historical research, collections management, preservation, and restoration of artifacts are central to the Museum's curatorial efforts. As a public institution, NASM devotes considerable attention to education and outreach activities, offering workshops, lectures, films, planetarium presentations, docent tours, and written materials to schools and visitors to the Museum. During FY 1987, the Museum

reorganized to balance its research, exhibitions, collections management, and education functions.

NASM handles exhibits preparation, collections storage and maintenance, preservation, and restoration at the Paul E. Garber Facility in Suitland, Maryland. At the Garber Facility, the Museum has restored more than 69 historic aircraft and spacecraft from its collection, with the restoration of additional artifacts planned each year. The Garber Facility also displays approximately 90 aircraft, numerous spacecraft, and other flight-related objects. NASM estimates that approximately 31,000 people will visit the Garber Facility in FY 1989.

Research - Research is the foundation of the Museum's efforts as a primary resource center for the science and technology of aviation, space, and geophysical science. Research findings also support the exhibitions, publications, and educational, historic restoration, and archival programs. Research undertaken by the Museum staff encompasses the history of aeronautics; the history of space science and exploration; contemporary developments in these fields; comparative studies of the Earth and other planets using satellite images and data; and infrared astronomy. In addition, the Museum engages in two applied research and development programs: the historic preservation of aircraft and spacecraft, and the storage and retrieval of archival and photographic information.

-- Aeronautics: With funding provided in FY 1989, the Museum will hire two senior-level curator/historians for the Aeronautics Department. These two new positions represent the first phase of a multi-year program to enhance the Museum's ongoing historical research efforts and eliminate current gaps in staff expertise. This enhancement will build upon the Department's recent efforts to conduct more comprehensive research on the history of aeronautics and its role in the broader context of United States and world history.

NASM has entered a cooperative venture with the Smithsonian Institution Press to publish the Smithsonian History of Aviation series. Through this program, the Museum and the Smithsonian Institution Press intend to attract the highest quality manuscripts produced by scholars working with the Institution. In FY 1989, the Smithsonian History of Aviation series will issue significant scholastic works on aviation history, such as Strike from the Sky: The History of Battlefield Air Attack, 1911-1945, by Richard Hallion, and Bonfires to Beacons: Federal Civil Aviation Policy Under the Air Commerce Act, 1926-1938, by Nick Komons. Publications in this series for FY 1990 will include Visions of a Flying Machine: The Wright Brothers and Invention, by Peter Jakab. Future publications will include translations of From the History of Soviet Aviation: The Aircraft of S. V. Ilyushin's Experimental Design Bureau, edited by G. K. Novozhilov, and a biography of Otto Lilienthal, including a history of his inventions, by Peter Jakab.

Other publications planned for FY 1990 include The Boeing 247, by Robert van der Linden, and a catalogue to accompany the centennial exhibit on Igor Sikorsky. Research and writing continue on several books to appear in upcoming years. These include a publication exploring the history of the development of the small gas turbine engine in the United States, a historical perspective of the civil pilot training program during Franklin D. Roosevelt's presidency, and a history of blacks in aviation.

-- Space History: The Museum's joint program of research and documentation of the Hubble Space Telescope project, in collaboration with the History of Science

Department at Johns Hopkins University, will serve as a rich source of research material for future historians and will provide a valuable current record of space technology. Cambridge University Press will publish The Space Telescope: A Study of NASA, Science, Technology and Politics, a monograph by Dr. Robert Smith on this work, in FY 1990. The Space History Department is also conducting historical research on satellites, the interaction of aerospace and computing technologies, spacesuit technology, weather satellites, and the Soviet space program.

The Glennan-Webb-Seamans Project continues its preservation and research program on the history of the Nation's space program, with emphasis on its administration and management. In FY 1989, the Project conducted oral history interviews with key administrators and program managers from the National Aeronautics and Space Administration (NASA) and aerospace industry executives and managers. In FY 1990, the Project plans to sponsor several research case studies on the interaction between government and the aerospace industry in implementing the space program.

Preparation of a national survey of resources for aerospace history and an in-depth survey of Washington-area resources for space history, in cooperation with NASA and the U.S. Air Force History Office, will continue in FY 1990. The success of the various oral history projects, which NASM began in FY 1986, has stimulated interest in experimenting with video histories and led to Sloan Foundation's funding of a pilot video history program. During the first two years, the Museum conducted video history sessions on a wide range of topics. These include the origins of the aerial reconnaissance studies at the Rand Corporation, the history of X-ray astronomy and aeronomy at the Naval Research Laboratory, aspects of the history of the Mariner Venus program, and observing techniques in ground-based astronomy. NASM has continued to participate in this Institution-wide video history project and has expanded new proposals to include the history of Soviet space biology and black aviation.

-- Earth and Planetary Studies: NASM established the Center for Earth and Planetary Studies (CEPS) in 1973. By analyzing remote-sensing data from satellites, the Center researches comparative planetology and the development of the Earth's landforms and surface composition. In FY 1983, NASA designated the Center for Earth and Planetary Studies as a Planetary Image Facility, a repository allowing researchers access to the collections of images of the planets taken by NASA space probes. Researchers from the Smithsonian and other institutions make extensive use of this facility. Plans are now under way to link the Planetary Image Facilities across the country. Using this computer network, each facility can share the images in its collection with other facilities that store images and information from different space missions.

Research projects on satellite remote-sensing of desert fringe regions have increased scientists' understanding of the effects of climatic change on surface materials in Africa's Sahelian zone. The Center for Earth and Planetary Studies has also conducted fieldwork in the inland Niger Delta of Mali, western Egypt, and northern Sudan. By combining recent satellite images with those taken 14 years earlier, researchers can better assess the movement of sand and soil that has taken place as a result of the recent drought. Research in mapping and analyzing surface features on the Moon and Mars continued throughout FY 1989 with funding by NASA. CEPS is also a partner in a NASA proposal for a major quantitative study, based on Landsat and other remote-sensing satellites, of the extent and rate of deforestation in the Amazon basin.

-- Laboratory for Astrophysics: NASM opened the Laboratory for Astrophysics in October 1988. Staff scientists of this new department will initially concentrate on the development and application of state-of-the-art technology for infrared astronomical spectroscopy, including instrumentation aboard the European Infrared Satellite Observatory. They will carry out research on planetary atmospheres, star formation, galactic shock phenomena, and other astrophysical processes. This new department has many interests in common with the Smithsonian Astrophysical Observatory. In addition, it will lend scientific insight and expertise to support the Museum's curatorial staff in communicating to the public an up-to-date scientific understanding of the universe.

Exhibitions - A new exhibition, "Beyond the Limits: Flight Enters the Computer Age," opened in May 1989. This major gallery traces the development and use of computers in aviation and aerospace industries from the 1940s and includes hands-on displays, interactive video units, a state-of-the-art theater, and a working robotic arm. The exhibit highlights seven areas to illustrate the primary applications of the computer in aerospace: Design, Aerodynamics, Computer-Aided Manufacture, Flight Testing, Air Operations, Flight Simulators, and Space Operations. A full-scale model of the radical X-29 aircraft with its forward-swept wings is on exhibit, along with spectacular video footage of the aircraft in flight. The exhibition also features a CRAY-1, one of the first production-model supercomputers, and a robot that builds and flies paper airplanes.

Other exhibit openings in FY 1989 include the Structural Dynamic Test Vehicle for the Hubble Space Telescope, the largest astronomical space telescope ever built. The art gallery opened an exhibit of Italian futurist artwork in June 1989. "Aeropittura Futurista: Images of Flight in Italian Art from 1913 to 1942" depicts Italian futurism, the first artistic movement to embrace technology as its subject and to glorify the airplane as a symbol of the modern age. In July 1989, the Museum commemorated the 20th anniversary of the first lunar landing with a lunar landing party including complete video coverage of this historic event and an art exhibition, "Eyewitness to Apollo 11." The exhibition includes 26 works of art and traces the development of the Apollo program and its crowning accomplishment--the Apollo 11 mission--through the eyes of artists as diverse in style and approach as Robert Rauschenberg and Norman Rockwell.

In FY 1990, an exhibit will commemorate the centennial of Igor Sikorsky's birth. Illustrating benchmarks in his life as a pioneer designer and industrialist, this exhibit will concentrate on Sikorsky's designs for aircraft, seaplanes, and helicopters. The Museum will remodel the Sea-Air Operations gallery in FY 1990 to expand the Ready Room and to offer a new film of aircraft carrier deck takeoffs and landings. The gallery will highlight the six major aircraft carrier battles in the Pacific during World War II, with special tribute to the USS Enterprise, the most decorated carrier of the Pacific war. "Commuting in the Modern Manner," a new exhibit centering around the fully restored Grumman Goose, will highlight the use of this amphibious aircraft during the 1930s.

The Museum's visitor information center will open in FY 1990. This series of six interactive units, stationed throughout the Museum, will provide visitors with current information on all Smithsonian museums, plus detailed information on all NASM galleries, films, and presentations. Also in FY 1990, the Museum will present the work of artist Roland Emert, including drawings of his unique and whimsical sculptures, such as the Pussiewillow II.

In FY 1991, a major new gallery entitled "Embattled Skies: The Emergence of Air Power in World War I," will open. Emphasizing the first-time use of aircraft as a weapon in war, this gallery will highlight the grim realities of aerial combat in contrast to the romanticized myth of "knights of the air."

For FY 1992, the Museum is planning "Where Next, Columbus?" an exhibition in conjunction with the Columbus Quincentenary that will examine prospects for discovering other "new worlds" in space during the next 500 years of exploration. Other planned topics include the roles of manned and unmanned space missions; long-term exploration of the solar system; alternatives to the chemical rocket using advanced propulsion concepts; astrophysical and physiological limits to space flight; and life support systems.

NASM presents films related to aviation and space flight in a specially equipped theater that uses an innovative, high-resolution projection system (IMAX) and a giant screen for extraordinarily realistic effects. The latest IMAX film, On the Wing, which premiered in June 1986, compares natural and artificial flight using a mechanical replica of the flying reptile, pterodactyl. Another recent IMAX film, The Dream Is Alive, features film footage shot by the astronauts on three shuttle missions. A new film project planned for FY 1990, entitled The Blue Planet, will use new IMAX film footage shot by the astronauts on recent and forthcoming shuttle missions to explain the functioning of global environmental systems. In recognition of the International Space Year 1992, the Museum will coproduce another IMAX film, To the Stars, highlighting achievements in space exploration by different countries. A new show in the Museum's planetarium, "Calling All Stars," takes viewers on a voyage to other worlds to explore current scientific thinking on the question of extraterrestrial life and the prospects for radio communication with other civilizations in space.

Development of Collections - In FY 1989, the Museum acquired a Lockheed C-130 Hercules, a typical combat cargo carrier used in Vietnam; a McDonnell-Douglas F4S Phantom II, a Navy carrier and U.S. Air Force standard fighter used in Vietnam; a Rolls-Royce Conway turbojet engine, a pioneer jet engine used on Boeing 707s and Douglas DC-8s; a blimp gondola from a K-ship of the type used during World War II; and a Goodyear ZPG-3W airship gondola from one of the last lighter-than-air ships created for the U.S. Navy ca. 1950. The Museum also accepted from Air France the promise of a Concorde airplane, to become part of the collection after its retirement from service.

In FY 1989, other important acquisitions included an antisatellite missile and pylon; a payload assist module; ordnance rockets and launchers; and a model of the "National Aero-Space Plane." Planned acquisitions for FY 1990 include a Pershing 2 missile (with a second one that the Museum hopes to trade for a Soviet SS-20 missile); an AQM-81A drone; an H-1 launch vehicle model; an H-2 launch vehicle model; and a MIDAS Infrared detector.

To date, NASM has acquired 31,000 feet of duplicate footage of original aviation newsreels produced by the Movietone News Company from 1919 to 1939. These cover subjects such as Charles Lindbergh and his Lockheed Sirius, the Spirit of St. Louis arriving at the Smithsonian Institution, Jack Northrop and the original flying wing, the Women's Air Derby of the late 1920s, a Graf Zeppelin over Berlin, and Amelia Earhart speaking to American women fliers. This extremely valuable footage (part of the collection of 800,000 feet of Movietone newsreel film on aviation currently owned by the University of South Carolina) is on nitrate film. Under the terms of an agreement signed with the university in FY 1986, NASM will retain a master negative

and a duplicate positive film copy of any nitrate film footage transferred to safety film and return a positive copy to the University for its collection. The goal is to save all of this historically valuable material for future generations.

Preservation and Restoration of the Collections - In FY 1989, NASM completed restoration of the German Arado 234, the first jet bomber; the ATS-6 applications satellite; an HS-293 glide bomb, a German World War II missile; the Mariner 10 structural/thermal engineering model; the Hughes Racer, a mid-1930s technological masterpiece for aircraft speed and design; the Hubble Space Telescope model; and the Mercury 14 capsule. Restoration will continue in FY 1989 on the rear fuselage of the B-29 bomber Enola Gay; the Japanese Aichi-Serian, a submarine-borne seaplane bomber designed for the sole purpose of bombing the Panama Canal during World War II; and a French Voisin, a World War I reconnaissance aircraft used for bombing. Restoration will begin in FY 1990 on the Sopwith Snipe, the ultimate Sopwith fighter design; a Fokker D VII, the most highly regarded German fighter aircraft of World War I; the Herring Curtiss, an early aircraft of the Curtiss pusher variety, significant in the development of flight control systems; the Hawker Hurricane, an early World War II British fighter famous during the Battle of Britain; and a B-29 engine. Planned FY 1991 restoration projects include the first wing of the Enola Gay; the Apollo 11 lunar command module; the (Horten) Gotha G0229, a technologically significant attempt by the Germans to develop a flying wing as a jet fighter interceptor; and a Shoemaker Canonhouse, a pre-World War I aircraft featuring a unique flight control system; a Titan rocket engine; and the Mercury 14 capsule. The treatment program, initiated in FY 1983 to reduce further deterioration of aircraft not yet restored, remains at the heart of the restoration activities.

-- Video Disc Project: This preservation program for archival photographs and other visual collections consists of photographing the images on 35mm film and then transferring this film onto video disc format. The project has transferred more than 825,000 images and completed six discs. By facilitating greater access to the collection and eliminating the loss or destruction of the originals, this project has expanded the availability of these vast collections to scholars throughout the world. The sixth disc, completed in FY 1989, contains images from all the U.S. lunar missions (Ranger, Surveyor, and Apollo), including photographs of rock and soil samples. The seventh disc, scheduled for production in FY 1990, will focus on photographs in the Museum's collections of rockets, missiles, manned space missions, aeronautical artifacts, and engines, as well as a valuable collection of images from the Deutsches Museum of Germany. NASM is now soliciting ideas for disc eight, which the Museum will produce in FY 1991 and FY 1992. Collections under consideration include the Wright Field aeronautical collection and planetary images. The program shares its technical expertise with other offices throughout the Institution.

As part of a recent reorganization, the Museum established a new Collections Management Division. One major goal of this new Division is to gain better physical and intellectual control over its document and audio-visual collections by implementing a formal archival program. With funding provided in FY 1989, the Museum will be able to reinforce its support for various collections management efforts. They include locating, surveying, and describing the vast archival collection; acquiring equipment and materials necessary to initiate the Museum's conservation program; purchasing equipment for participation in the Institution-wide automated Collections Information System (CIS); and converting the film collection to a long shelf-life format.

Public Education and Orientation - The Museum's educational programs continue to serve an expanded national and international audience. The Education Resource Center (ERC) opened in January 1988, modeled after NASA's Teacher Resource Centers, with support from NASA and other agencies. It provides slides, video tapes, photographs, software, and written materials to educators on aerospace-related topics. To date, more than 3,700 teachers have visited the Center. In FY 1989, the Museum's education department held numerous workshops for in-service and graduate credit for teachers. Topics included weather, astronomy, living in space, the space shuttle, and manned space flights. The Center will repeat the most popular workshops in FY 1990. In FY 1989, the education department completed curriculum materials for "Beyond the Limits: Flight Enters the Computer Age," "Fragile Earth," "Exploring Space," and "Weather or Not." In FY 1990, planned curriculum materials include "Exploring Planets," "The Blue Planet," and an update to "Looking at Earth."

In summer 1989, with a grant from the Smithsonian Educational Outreach program, the Museum conducted four one-week workshops for students 8-14 years of age throughout the District of Columbia. The workshops, developed in cooperation with the Anacostia Museum, allowed the participants to visit NASM, the Anacostia Museum, and the Goddard Space Flight Center to launch their own handmade rockets.

The Museum also received a grant from the Association of Science and Technology Centers to train teachers from the District of Columbia in developing educational materials for their classrooms. Forty of the 94 members of the Museum's Regional Resource Program participated in the August 1989 meeting, receiving updated briefings from Museum staff on the Museum's collections, research, restoration, and education programs.

In FY 1988, the Museum began a new educational outreach program aimed at minority students in the local community. This program provides speakers and educational materials directly to the classrooms of elementary and middle schools. It is popular with the local community and will continue throughout FY 1989 and beyond.

The Museum launched Air and Space/Smithsonian magazine in FY 1986 as a bimonthly educational and informative publication addressing broad issues on aviation and space flight for the public. Market research indicated a higher than average appeal for a magazine of this type. The paid circulation is 311,000.

NASM continues to present numerous free lectures, seminars, symposia, and films to the public. The General Electric Aviation Lecture series for FY 1990 features Brig. Charles E. Yeager (USAF Ret.); Ralph Lightfoot, who worked with Igor Sikorsky in developing flying boats and helicopters; Air-Vice Marshal Ronald Dick (RAF) on transitioning from piston-powered aircraft to jets; and Group Capt. Peter Squire (RAF) on air war in the Falklands conflict. At the 13th annual Von Braun Memorial Lecture in January 1990, Gen. Bernard Schriever (USAF Ret.) will speak on the civilian military relationship in the space program. Najeeb Halaby, former administrator of the Federal Aviation Administration and past president of Pan American World Airways, will present the Charles A. Lindbergh Memorial Lecture.

Other highlights in FY 1990 include the International Conference on Aerospace History, which will consider topics such as "Manned vs. Unmanned Flight," "The Aviator and Astronaut as Icon," and "Problems in Writing the History of Technology." Also in FY 1990, a 14-part series of lectures and panel discussions on "The Legacy of Strategic Bombing" will examine the origins, practice, and consequences of strategic bombing, from its earliest premonitions before World War I, through its most intense

employment during World War II, and up to its influence on the development of today's strategic nuclear arsenals. Guest speakers will include Philip Morrison, Max Hastings, Freeman Dyson, Kurt Vonnegut, Curtis LeMay, R. V. Jones, Lewis F. Powell, John Kenneth Galbraith, Paul H. Nitze, Lord Solly Zuckerman, Bernard A. Schriever, McGeorge Bundy, and other experts in the field.

The Museum's Albert Einstein Planetarium will host the Tenth International Planetarium Director's Conference in September 1990. Planetarium directors from around the world will meet in Washington and also visit planetaria in New York, Philadelphia, and Richmond.

The Monthly Sky Lecture series will continue in FY 1990 with the theme "The Contrast of Orderly and Chaotic Structures in the Universe." The film series continues its popular movies in FY 1990, including Twelve O'Clock High, Slaughterhouse Five, Dr. Strangelove, On the Beach, and War Games.

In August 1988, a new public cafeteria and restaurant began serving visitors to the Air and Space Museum. In a new glass-canopied addition to the building, this facility has expanded seating capacity and greatly improved access over the original third-floor cafeteria. Museum visitors have the option of cafeteria service at the "Flight Line" or full-service meals at the "Wright Place." From its August opening through May 1989, more than 1,223,892 patrons dined at both the "Flight Line" and the "Wright Place."

Publications - In FY 1989, the Museum published Beyond the Limits: Flight Enters the Computer Age, by Paul Ceruzzi, to accompany the new exhibit gallery of the same title. In FY 1990, the Museum will publish The Boeing 247, by Robert van der Linden; Visions of a Flying Machine: The Wright Brothers and Invention, by Peter Jakab; United States Women in Aviation, 1940-1985, by Deborah Douglas; Our Weather from Above: America's Meteorological Satellites, by Janice Hill; and a new edition of The Jet Age: The First 50 Years, edited by Walter Boyne, Donald Lopez, and Ron Dick. Future publications include Suiting Up for Space: A History of U.S. Space Suits, by Lillian Kozloski; Rockets Red Glare: Congreve and Hale Rockets of the 19th Century, by Frank Winter; Science with a Vengeance: Origins of Space Science in the V-2 Era, by David De Vorkin; Commuter Airlines of the United States, by Ronald E. G. Davies; Caring for the Collections of the National Air and Space Museum, by Lin Ezell; and A Catalog of the Art Collection of the National Air and Space Museum, by Mary Henderson.

EXPLANATION OF PROGRAM INCREASE:

For FY 1991, NASM requests an increase of 4 workyears and \$187,000 for a museum curator for military history (1 workyear and \$50,000); a museum specialist for restoration (1 workyear and \$38,000); a remote-sensing scientist (1 workyear and \$50,000); a computer specialist for interactive displays (1 workyear and \$40,000); and preparation of a world atlas of satellite images (\$9,000).

Museum Curator for Military History (1 workyear and \$50,000) - Part of the National Air and Space Museum's mission is to increase the public and scholarly understanding of the historical impact of aviation. In the past, the Museum has concentrated on the technological and heroic aspects of the subject. But this is not the full story. The airplane has brought profound changes in the shape of war and peace, altering the form of both tactical and strategic operations, tending to blur the distinction between soldier and civilian, and reconfiguring the industrial base of

military establishments. In representing this area, the Museum has heretofore suffered from deficiencies in its exhibitions, publications, and collections.

Although the present Museum staff has some expertise in certain specialized areas of military aviation, such as World War II Japanese aircraft, the Museum has no one with a broad overview of the history of military aviation. A military historian will fill an important gap in staff expertise, allowing the Museum to portray more fully the impact of aviation on modern history and contemporary life.

The requested increase will enable the Museum to add a curator (1 workyear and \$46,000) with this expertise and to cover research travel costs for the position (\$4,000). The curator will play an essential role in developing the forthcoming major exhibition on the history of strategic bombing, as well as contribute to the current upgrading of the World War I gallery, to a future upgrading of the World War II gallery, and to the eventual development of a major exhibition on military aviation in the Vietnam War. These exhibitions are critical if NASM is to express the full role of military aircraft in human terms. These exhibitions will also be an opportunity for NASM to bring some of its most important artifacts, such as the Enola Gay, to public attention. Through developing these exhibitions, the curator also will promote the Museum's research and restoration programs.

NASM seeks to enhance its collections, exhibitions, research, and staff expertise by incorporating a broader overview of the history of military aviation. Working in collaboration with NASM's exhibition, research, and restoration programs, a military history curator will help the Museum to fulfill its obligation to the public and to scholars to consider the application of aviation technology to modern warfare and the resulting profound changes in the shape of war and peace in the 20th century.

Museum Specialist for Restoration (1 workyear and \$38,000) - The Museum must restore the airplanes and spacecraft in its collections if future generations are to see the great accomplishments of the 20th century. Artifacts restored to their original condition become the focus of public exhibitions, and their presence ensures that visitors and researchers of the future have access to objects that reflect the history of aviation and space flight. Many aircraft and spacecraft in the Museum's collections do not receive adequate attention and preservation due to limited human resources. Restoration of these craft becomes more expensive as the collections deteriorate, because the damage becomes more extensive and technicians must refabricate badly damaged pieces. Immediate attention is imperative to maintain the collection and to control future restoration costs.

The requested increase will allow the Museum to hire a senior-level restoration specialist (1 workyear and \$38,000) to address a backlog of short-term preservation tasks and provide professional expertise to ongoing collections care. This specialist will be the restoration team leader, applying knowledge of aircraft and spacecraft structures and mechanical systems to the treatment of historically significant artifacts. Objects proposed for restoration in FY 1991 include the Apollo 11 lunar command module, the B-29 bomber Enola Gay, a British Hawker Hurricane fighter, the Gotha G0229, a Shoemaker Canonhouse, a Titan rocket engine, and the Mercury 14 capsule.

A growing backlog of objects await their turn in the NASM restoration shop, and the Museum will include many of them in exhibits planned for an extension to the Air and Space Museum. The restoration process also facilitates research in aircraft history. Restored aircraft go on loan to other museums, and restoration specialists

gain extensive knowledge about the structure, materials, and instrumentation of the craft during the restoration process. The Smithsonian and the Nation risk the loss of important historic artifacts and their contributions to history if they are not preserved and restored as expeditiously as possible.

Remote-Sensing Scientist (1 workyear and \$50,000) - Air and spacecraft provide vital observational platforms for monitoring global environmental consequences of human activity, such as desertification, deforestation, and soil erosion, as well as climate change and the decline of stratospheric ozone. Scientists in the Museum's Center for Earth and Planetary Studies (CEPS) apply the experience and techniques they have gained from planetary studies in various remote-sensing investigations of terrestrial deserts.

CEPS needs the expertise of an atmospheric scientist to make the atmospheric corrections necessary to interpret remote-sensing data. This specialist will interpret the surface geological record in arid regions and direct studies of natural and manmade climate changes. The scientist will also contribute to the development of Museum exhibits on global climate change and related environmental problems.

The requested increase will allow the Museum to hire a remote-sensing scientist (1 workyear \$46,000) and to fund travel expenses associated with presenting research at conferences and staying informed of the latest developments in the field (\$4,000). This position will reinforce CEPS current staff expertise in applying the technology of satellite data analysis to develop a deeper understanding of our environment.

Global change that will impact on the future of all life on Earth is presenting increasingly critical and difficult questions for this generation. To address these questions, NASM and CEPS can apply their expertise in planetary studies to analyze changes in our planet. A remote-sensing scientist will interpret climatic factors for environments as diverse as deserts and tropical forests to address these issues.

Computer Specialist for Interactive Displays (1 workyear and \$40,000) - Within the Museum's vast exhibition galleries, interactive exhibitions and automated equipment are dependent on centralized computers. By using computer control of these displays, the Museum can maintain optimal operating efficiency and effective exhibits. Since almost all of NASM's new and most popular exhibits include interactive video displays, the exhibits department requires the expertise of a computer specialist to develop, program, and maintain these exhibits. A computer specialist will enable the Museum to produce and reinterpret exhibitions so that they appeal to, enfranchise, and are understood by the broadest possible audiences.

The requested increase will allow the Museum to hire a computer specialist (1 workyear and \$36,000) to be responsible for the development, programming, and maintenance of all interactive computer displays throughout the Museum. The addition of this position will eliminate the need to utilize more expensive contract services to bring these interactive displays on-line and keep them running in proper operating condition seven days a week year round. This increase will also provide additional funding to purchase necessary supplies, including equipment and computer software (\$4,000).

Effective exhibitions are key to a successful museum program, and efficient maintenance and optimal operations are key to supporting those exhibitions. NASM's innovative use of hands-on, interactive displays and centralized computer support of those displays have enhanced the visitors' experience at the Museum and proven the

effectiveness of this technology. A computer specialist will maintain the technical operations and programmatic success of this approach to public education.

Preparation of a World Atlas of Satellite Images (\$9,000) - As part of the Smithsonian's contribution to the Smithsonian commemoration of the 1992 Columbus Quincentenary, NASM will publish a Smithsonian Satellite Atlas of the World. The atlas will contain the first complete coverage of the Earth's land masses as seen from orbit by such systems as Landsat, SPOT, the space shuttle imaging radar, and remote-sensing satellites of other nations. A users guide will provide information on the sensors, the missions, and on the availability of such images from orbit.

NASM will cooperate with other interested agencies, including the National Air and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), the European Space Agency, EOSAT Corporation, SPOT Image Corporation, and the Environmental Research Institute of Michigan, to obtain satellite images for this project.

The Museum currently has a base of 1 workyear and \$41,000 for this project. The requested increase will also make it possible for the Museum to purchase the satellite images and necessary supplies and to pay travel expenses that NASM researchers incur in meeting with representatives from other agencies to collaborate on the project and obtain the best available satellite images for the atlas. NASM will complete the atlas in FY 1992.

The atlas will provide the public and scientists around the world with a major reference on world physiography and satellite imagery. It will explain the scientific principles and practical applications of cartography and satellite remote sensing. The atlas will portray the spectacular advances in our knowledge of the Earth as the result of space missions.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds come from a variety of sources, including the Museum's share of the net proceeds from the museum shops and restaurants, the net proceeds resulting from bureau activities (such as the theater and planetarium), and small allotments. In addition to meeting expenses of the theater and planetarium, these funds finance fellowships, research chairs, guest lecturers, symposia, and special events. A portion of the proceeds from the theater and planetarium provide particular support for the production of new IMAX films, including The Dream Is Alive, On the Wing, and The Blue Planet, as well as other planetarium shows and Museum programs. For example, in March 1989, Calling All Stars premiered in the Albert Einstein Planetarium. The show traces efforts to locate life in the Universe. The Museum also received supplemental outside funding for these new films. The Lindbergh Chair of Aerospace History and the International Fellowship provide continuing support for distinguished scholars to study at the Museum. Other fellowship programs include Guggenheim, Verville, and Martin Marietta internships, which support pre-doctoral and postdoctoral students and distinguished scholars in aviation and space science.

Restricted Funds - Funds provided are in the form of restricted endowments that specify the use of donations or bequests and of gifts and foundation grants by individuals, organizations, or corporations for specific purposes. Examples of these funds are the Ramsey Endowment, for research relating to naval flight history; the Guggenheim Endowment, for lectures and stipends; and the NASM Educational Fund. The

Sloan Foundation provided grants beginning in FY 1987 for a four-year video history program as well as a workshop, video disc, and curriculum package on aviation history. NASM received numerous corporate donations, both monetary and in kind, to support the gallery "Beyond the Limits: Flight Enters the Computer Age" in FY 1987, FY 1988, and FY 1989, and will receive further corporate donations in FY 1990. The Glennan-Webb-Seamans Fund for Research in Space History received additional funds in FY 1989 from corporate sources.

Federal Grants and Contracts - Various agencies and departments provide funds for special projects conducted at NASM because of the Museum's expertise in a given area. Continued funding from the National Aeronautics and Space Administration grant program supports research activity in planetary geology by the Museum's Center for Earth and Planetary Studies; specifically, photogeologic investigation of planetary tectonic features, the structural geology of the Basalt Plains of Washington State, and the Planetary Image Facility. The research project on satellite remote sensing of central Mali, which began in FY 1984, continues to determine the long-term effects of climate change on the fragile environment of the inland Niger Delta region. This research expanded in FY 1985 to cover fringe areas of the world's deserts and will receive continued financial support. The Space Telescope Historical project, a joint effort between Johns Hopkins University and NASM, with partial funding from NASA, will complete its planned publication in FY 1990. The Laboratory for Astrophysics has received funding from NASA for continued research in the field of infrared astronomy.

NATIONAL MUSEUM OF AMERICAN HISTORY

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	334	14,502	3	201	9	386	3	2,281	-	-
FY 1990 Estimate	340	15,666	2	184	9	368	2	1,796	-	-
FY 1991 Estimate	367	16,726	1	131	9	340	2	1,773	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Museum of American History (NMAH) houses the National Collections that represent the political, cultural, scientific, and technological development of the United States. The Museum devotes itself to preserving the national heritage by improving and conserving its collections and interpreting these materials for the public and scholarly community. Through exhibitions, research publications, and an array of lectures, symposia, concerts, tours and demonstrations, and film and broadcast features, NMAH presents the unique cultural and scientific heritage of the United States to more than six million visitors per year. In addition to the Mall building, the Museum maintains the exhibition "1876 Centennial," located in the Arts and Industries Building, and cares for collections stored and exhibited at six buildings in Suitland, Maryland, and one building in Springfield, Virginia.

For FY 1991, the National Museum of American History requests an increase of 22 workyears and \$1,060,000 to provide: full collections management accountability (14 workyears and \$433,000); critical storage space for displaced collections (1 workyear and \$140,000); a permanent curator and support for the Division of Computers, Information, and Society (1 workyear and \$73,000); a permanent research program on African-American communities (1 workyear and \$18,000); technical support to researchers (3 workyears and \$112,000); a reference archivist (1 workyear and \$34,000); and programs and exhibits to commemorate the Columbus Quincentenary (1 workyear and \$250,000). In addition, the Museum also requests 5 workyears for the continuing curation of the Duke Ellington Collection.

PROGRAM - The National Museum of American History possesses the largest and most comprehensive collection of its kind in the world. Covering a wide spectrum of materials, sizes, and descriptions, its holdings comprise 16 million stamps, one million numismatics specimens, and more than two million objects including railroad trains, automobiles, textiles, photographs, paintings, sculpture, paper materials, clothing and costumes, tools, power machinery, clocks, weapons, ceramics and glass, musical instruments, and scientific instruments of all kinds.

Collections Management - The Museum's goal is to preserve and protect this irreplaceable "history book of objects" through a strong collections management

program that includes proper storage, conservation, registration, and archival functions.

-- Master Space Plan: The Museum's Master Space Plan is a long-term, multi-million dollar program that integrates the retrofitting of the American History Building's climate and safety systems with the redesign and reinstallation of the Museum's exhibition halls. During FY 1989, Phase I work proceeded on four floors of the Museum, including exhibit, storage, and office spaces. Staff cleaned, packed, recorded, and moved several thousand objects to off-site storage in Springfield, Virginia, as well as to other locations within NMAH.

-- On the Mall: In FY 1989, the Museum continued an active acquisition and loan program and relocated thousands of objects under the Museum's Master Space Plan. More than 17,000 objects came into the permanent collections, while the Museum loaned or borrowed 3,932 objects for exhibition or study. The Collections Management Steering Committee guided efforts to complete old accessions through Accountability Plans that establish priority targets and schedules. Staff began to use a newly designed, automated Local Collections Information System for tracking locations and doing new acquisitions, loans, and basic cataloguing. The Museum conducted a comprehensive internal study of its major functions as part of planning for the Smithsonian's Collections Information System. Staff continued to organize and make early collection files more accessible for research and accountability.

-- Off-site Storage: In FY 1989, the Museum continued the program begun in FY 1985 to clean collections of asbestos and make them accessible for exhibits, research, or loan. Staff placed sensitive collections from other Suitland buildings and from the Mall into modern storage cabinets in newly renovated Building 19 in Suitland, Maryland. The Museum upgraded security and storage in warehouse space at the Fullerton Industrial Park in Springfield, Virginia, and began sending collections there.

-- Museum Support Center: In FY 1987, the Museum began formal planning for the transfer of collections from several of its curatorial divisions to the Museum Support Center (MSC) in FY 1991 and beyond. In FY 1989, staff prepared and packed 4,000 objects at Suitland, Maryland.

Collections Acquisition - In FY 1989, the Museum received many significant objects through purchases and gifts. The acquisitions of the Department of the History of Science and Technology included: three pioneering medical diagnostic instruments in the field of fiber optics; an experimental robot from the National Bureau of Standards; Digital Equipment Corporation's PDP-1, the first true minicomputer; the Xerox Alto, the source of many ideas for the Apple Macintosh computer; International Business Machines' SCAMP, the company's first microcomputer and one of the first personal computers; a spyglass made for the Signal Corps of the Confederate Army, early 1860s; and a terrestrial globe designed by Ellen Liza Fitz of Boston in 1878.

The Department of Social and Cultural History accessioned 21 outstanding occupational portraits documenting 19th-century trades; a toast rack made by Andrew Warner in the mid-1800s that is a fine example of a rare form of American domestic silver; the Larry Zimmerman Fair and Exhibition Collection of 5,000 items documenting world fairs; a collection of more than 100 labor union badges, ribbons, and emblems, ca. 1880-1920; the Salem China Company Collection of 300 pieces of ceramic tableware dating from 1930 to 1960; the Mormon pilaster capital (Sunstone) from Nauvoo,

Illinois, 1846; drawings from Walt Disney's Steamboat Willie produced in 1928; a vaudeville trunk belonging to George Burns and Gracie Allen; a rare early 18th-century embossed silk counterpane; one of the first American presses for hobby printers, made in Boston ca. 1860; and the Erard Grand Piano, built for Queen Victoria--a mint example of one of the finest pianos of the mid-1800s.

Important donations to the National Numismatic Collection and the National Philatelic Collection included 48 ancient Greek silver fractional coins of the 5th and 4th centuries B.C. and two panes of stamps issued to U.S. soldiers in the World War I Expeditionary Force to send letters home.

Conservation - In FY 1989, the Division of Conservation surveyed, treated, and mounted more than 3,200 objects, primarily in response to exhibition and loan requests. Conservation of the Museum's costume and textile collections continued as a major emphasis in FY 1989. Staff examined, stabilized, and rehoused more than 350 flags, uniforms, and other textiles in the Armed Forces History collections. Architectural and engineering work began for the new laboratory devoted to the Museum's large collections of historic textiles, costumes, and fragile organic materials. The Division contracted a conservation technician to begin an exhibit cleaning and maintenance pilot program, resulting in substantial improvements to the safety and appearance of the objects.

Archives - In FY 1989, the Archives Center opened the privately funded Center for Advertising History, which sponsors oral history and other research projects relating to advertising in America. Distinguished industry and academic representatives serve on the Center's advisory board. Staff continued cataloguing and began microfilming and conserving the Duke Ellington Collection of musical manuscripts and related historical materials. Descriptive guides now serve researchers of African-American, military, and transportation topics in the Sam de Vincent Illustrated Sheet Music Collection. Additional boons to researchers are a new guide to the popular Warshaw Collection of Business Americana and improvements to the facility, including larger research areas and compact, movable shelving.

Research - Staff members in the Department of Social and Cultural History are working on a variety of research projects that draw from the existing collections and inspire future collecting endeavors. Domestic Life staff, interns, and volunteers are studying changes in 20th-century American household technology. Research on patent models resulted in several publications and a major exhibition that will tour Japan. The Museum may redesign this exhibition to tour the United States in 1990 to help commemorate the bicentennial of the American Patent System. Pioneering work on clothing by Division of Costume staff led to the Smithsonian Institution Press's publication of Men and Women: Dressing the Part, which explores how clothing reflects attitudes toward gender, a related exhibition, and several papers and publications on 18th- and 19th-century clothing. Graphic Arts researchers are doing groundbreaking work on type makers' marks, from which they will publish a catalogue of the world's largest collection of 19th-century American printing type. Other Graphic Arts projects include a checklist of prints based on the paintings of Albert Bierstadt and a catalogue of the collotypes in the collection. Division of Textiles staff is researching an 1834 sample book of fabrics from Fort Gibson, Oklahoma, to identify manufacturers involved in the Indian trade, the types of fabrics they marketed, and additional information on aspects of trade in the West.

Staff members from the Department of the History of Science and Technology have used the unique Smithsonian Videohistory Program to produce a videohistory of robots

and interview important inventors, including Mikhail Timofeyevich Kalashnikov, the designer of the AK 47 assault rifle, and Dr. Robert Ledley, inventor of the first whole body CAT-scanner. Medical Sciences staff members are researching the use of silver in medical instrumentation manufacture and methods of producing dosage forms for homeopathic pharmaceuticals. Transportation staff has nearly completed a major project listing 48,000 photographic images in the Railroad collection and continue research on the design and adaptation of closed automobiles. The Division of Engineering and Industry's work with artifacts from the Boston firm of William Bond and Son has inspired a book manuscript now in progress, and Division of Electricity and Modern Physics staff is researching 19th-century electrical instruments invented by Charles Page. The Department has published original research in the areas of navigational instruments, the history of computing, and the fire ant campaign of the 1950s. Collections-based publications under way cover U.S. microscopes, the Eisenhower jacket, preserving military headgear, a history of the dentist's office, and American clocks. This Department also contributed to the patent model exhibit mentioned above.

Staff prepared the papers of the important 19th-century architect Robert Mills, designer of the Washington monument, for publication in microfilm in conjunction with the Universities of South Carolina and Iowa, with support from the National Historical Publications and Records Commission, the National Endowment for the Humanities, and various private organizations.

Exhibitions - The Museum's long-term Exhibition Reinstallation Program calls for the redesign of many of the Museum's exhibit halls with an up-to-date interpretation and presentation of the collections. In FY 1989, NMAH installed 23 exhibitions. Highlights include: "The Ceremonial Court," a permanent hall that displays several First Ladies' gowns, White House china, jewelry, and other objects from the Museum's collections in a re-creation of various White House spaces; "The Way to Independence: Memories of a Hidatsa Family, 1840-1920," which chronicles the transformation of American society through the experiences of three members of a Hidatsa Indian family; "The Perpetual Campaign: How Presidents Try To Persuade the People," which celebrates the bicentennial of the first presidential inauguration and traces how presidential candidates over the years have sought the votes of the American people; "American Television from the Fair to the Family, 1939-1989," which follows television's journey from the 1939 New York World's Fair to its all-pervasive window on the world 50 years later; "Duke Ellington, American Musician," which commemorates Duke Ellington's career and musical legacy; and "Men and Women: A History of Costume, Gender and Power," which takes a look at some of the standards of appearance and behavior for men and women in American culture. "Fabric of a Friendship" and "Delaware 350," a double traveling exhibition, marked the 350th anniversary of the first Swedish and Finnish settlements in the United States and the relationship between those early settlers and the Algonquin Indians of the Delaware River Valley. Another traveling exhibition, "Sports Feelings: U.S./Soviet Sports Photography," featured 120 American and Soviet sports photographs depicting the universality and humanity of sports.

In FY 1990, NMAH will open its largest and most interactive exhibition to date. "The Information Age: People, Information, and Technology," a permanent show focusing on people rather than machines, will allow visitors to understand how information technology has changed the ways we live and interact over the last 150 years. A major temporary exhibition, "From Parlor to Politics: Women in the Progressive Era, 1890-1925," will examine how the rhetoric and imagery of feminine domesticity paradoxically justified women's participation in major social and political restructuring of American society. In FY 1990, the Museum will complete plans for a

comprehensive visitor information and signage system. A combination of interactive graphic display monitors and fixed directional signs will provide the visitor with information about exhibitions, collections, public programs, and staff.

Public Programs - In FY 1989, the Museum's Department of Public Programs presented a wide variety of education activities, publications, forums, and media events with an emphasis on encouraging the participation of minority audiences. Popular programs emphasizing the cultural heritage of African, Asian, Hispanic, and native Americans included: the Program in African American Culture, the Jazz in the Palm Court Series, the American Sampler Program, and the Jacksonville Bandstand Program. The All-American Music Series presented four free concerts a month in Carmichael Auditorium, and NMAH held a month-long Ellington Festival to commemorate the 90th anniversary of Duke Ellington's birth and the Museum's acquisition of the Ellington Papers. The Museum hired a permanent director to take charge of the new Program in Hispanic-American History. By revising training and use of docents, the Museum doubled visitor participation in tours and demonstrations. The Museum won private funding support for its first Science Learning Center, which will open in 1993 in conjunction with the "Science in American Life" exhibition.

Other highlights of the year include:

- a three-day public conference on "Contemporary Black American Congregational Song and Worship Traditions," produced by the Program in African American Culture;
- an American Sampler program on "Dancing and Drumming Traditions," which compared African-American and native-American 19th-century musical traditions;
- a symposium on Spanish-native American relationships in the Southeast and the Southwest during the Colonial period, bringing together archeologists, historians, and ethnohistorians in a daylong public forum;
- a performance-workshop by San Antonio's Little Joe y La Familia, including a commentary on the blending of Hispanic, Anglo-American, and Czech musical influences into the distinctive norteno style played by this group;
- a two-day public discussion of the Constitutional issues surrounding the internment of Japanese Americans during World War II, in conjunction with the "A More Perfect Union" exhibition.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the National Museum of American History requests an increase of 22 workyears and \$1,060,000 to provide: full collections management accountability (14 workyears and \$433,000); critical storage space for displaced collections (1 workyear and \$140,000); a permanent curator and support for the Division of Computers, Information, and Society (1 workyear and \$73,000); a permanent research program on African-American communities (1 workyear and \$18,000); technical support to researchers (3 workyears and \$112,000); a reference archivist (1 workyear and \$34,000); and programs and exhibits to commemorate the Columbus Quincentenary (1 workyear and \$250,000). In addition, the Museum also requests 5 workyears for the continuing curation of the Duke Ellington Collection.

Collections Management Accountability (14 workyears and \$433,000) - The Museum documents its collections on several levels. Simple registration of an object establishes terms of borrowing or ownership. Detailed cataloging of an object serves

sophisticated research. To accomplish these two levels, staff needs to enter enough information into the computer to keep track of where the objects are, answer public inquiries, plan exhibitions, and do simple research. By such basic documentation the Museum can account for the physical security of the collections and use the collections for educating and edifying the public. During the comprehensive collections management/inventory program, which the Institution conducted from FY 1979 to FY 1983, the Museum confirmed the enormous task of forming and maintaining a centralized, adequately documented control file from several different and sometimes inadequate sets of records maintained by its 21 collecting units. It was clear that computers were essential to manage the tens of thousands of entries made annually within the Museum's record systems.

Since 1983, the Museum has installed the necessary automation systems. During this period, however, Museum renovations, asbestos removal, and other competing collections work have prevented rapid progress in reducing continuing backlogs in collections processing and providing a computerized central file.

A recent Smithsonian Office of the Inspector General's report on collections management at NMAH highlighted the Museum's need to redouble efforts to achieve a central, computerized, accurate records file to control its collections. In response to the report, the Museum drafted a master plan, using newly established computer systems, that outline schedules and assignments for completing basic documentation. The collections in greatest need include the Museum's most sensitive objects in the Armed Forces History, National Numismatic, and National Philatelic collections. This plan will eliminate long-standing backlogs in record keeping, including initial registration, that exist in all departments.

Five requested permanent positions will assist departments with the greatest need. Nine term positions will address urgent problems in sensitive collections in NMAH and at storage buildings in Suitland, Maryland. The requested increase will enable the Museum to contract for specialized services for two very large and valuable collections requiring expertise in specific fields: the Jackson Collection in the Armed Forces History Collection and the Eckhardt Collection in the National Philatelic Collection. The Museum will also use the requested funds for cataloguing supplies.

Storage Space Rental (1 workyear and \$140,000) - Leased space at the Fullerton Industrial Park in Springfield, Virginia, will house displaced collections while the American History Building is renovated and staff reinstall major exhibition halls.

The Museum needs a total of 48,000 square feet to house objects safely during this period. To create essential storage spaces to support the Master Plan, the Museum requested funding for 36,000 square feet in FY 1990 and requests funding for an additional 12,000 square feet in FY 1991. The Museum and Smithsonian decided to lease space after exploring and rejecting other options because of costs, security problems, or inadequate environmental systems.

The funds requested will pay rental costs of \$108,000 on 12,000 square feet of storage space. In addition, the Museum will hire a manager (1 workyear and \$32,000) to ensure controlled access to the storage areas and oversee proper storage conditions and inventory controls. At present, staff members at Suitland, Maryland, take time away from asbestos removal to make the 50-mile round trip to oversee the Fullerton storage site. The new position will provide greater control at Fullerton, eliminate unnecessary trips, and allow work at other locations to proceed without interruption.

This storage space will permit the renovation of the American History Building to proceed in a timely fashion; eliminate improper storage of objects in corridors; ease access to the collections for research; strengthen collections management efforts; and provide staging and swing space for the Suitland Butler Buildings now undergoing repair. NMAH will need this level of funding until other storage facilities become available.

Curator and Support for the Division of Computers, Information, and Society (1 workyear and \$73,000) - The Institution can make a significant contribution to research in the field of computer technology. This important new area of public and scholarly concern has had a tremendous impact on scientific and technological fields and a profound effect on 20th-century social history. The Museum's collection in this subject area is increasing each year. In 1989, NMAH accessioned 155 objects, including three significant items: Digital Equipment Corporation's PDP-1, the first true minicomputer; International Business Machines' SCAMP, the company's first microcomputer; and the Xerox Alto, the source of many ideas for the Apple Macintosh computer. In 1990, NMAH will open a multi-million dollar, 14,000-square-foot permanent exhibition entitled "The Information Age: People, Information, and Technology."

The large permanent collection of computer artifacts requires a curator to provide care, conduct original research, and respond to general and scholarly information requests. The curator will establish the division's goals and future collecting activities and priorities. The curator will manage the permanent exhibition--the largest in the Museum--and direct changes and improvements. The curator also will develop a variety of interpretive programs to help audiences understand the subject.

With funds requested, the Museum will hire a curator (1 workyear and \$64,000) and provide equipment (\$5,000), travel (\$2,000), and supplies (\$2,000).

African-American Communities Project (1 workyear and \$18,000) - The African-American Communities Project collects and classifies information about black life in selected cities and disseminates it to social history scholars around the country.

The project has the largest data base ever assembled on pre-Civil War free blacks. With historical data on free black communities in ten pre-Civil War northern cities, the Project has analyzed the structure and function of black families, institutions, and the political and social organization within these African-American communities. This research illustrates the extent to which blacks exercised control over their local communities and organized themselves to address local challenges while remaining committed to the wider issue of civil rights.

The Project continues to expand its holdings, adding data from the Black Abolitionist Papers microfilm. With the support requested for FY 1991, it will assemble new data on antebellum blacks into an index of information and writings by and about abolitionists. The Project will also work to improve dissemination of information to the research community and the public.

Currently the Project's staff consists of one part-time museum curator and occasional support staff provided by intermittent grants. Funding requested in FY 1991 will provide a research assistant to ensure that the Project work continues.

The African-American Communities Project supports research in an important cultural area and improves the balance of public programs relating to minorities. Materials developed by the project influence exhibits at the National Museum of American History and at other museums around the country. The Project will move the Museum to the forefront of historical research and scholarship on minority contributions to American society.

Research Assistants (3 workyears and \$112,000) - In the last 25 years, the Museum has increased the curatorial staff without a corresponding increase in technicians and specialists to support research. Increases in collections, public programs, and exhibition production have also demanded more time of available staff. Similarly, funds for travel, equipment, and supplies for research have not kept pace with curatorial staff additions. The Museum will strengthen research in the Departments of Social and Cultural History and the History of Science and Technology by hiring specialized research assistants to help curators in research projects.

The Museum will hire a series of short-term specialists (2 workyears and \$52,000) to do basic research to assist curators. The Museum will rotate the positions to curators as needed. Funding also will provide travel (\$10,000), publications (\$6,000), and computer support (\$12,000). These additions will give curators time to write exhibition scripts, provide general exhibition oversight, and respond to public inquiries. With more staff support, curators can continue their day-to-day responsibilities while pursuing their research objectives more vigorously.

The requested increase will also allow the Museum to hire an assistant editor (1 workyear and \$32,000) for the American Quarterly. This journal, now based at NMAH, is the leading American studies journal in the country and one of the oldest interdisciplinary journals in the humanities. The assistant editor will manage the publication, coordinating peer review of manuscripts and editorial and production schedules, while performing other editorial functions. This request will provide technical support for curators involved in research projects.

Reference Archivist (1 workyear and \$34,000) - Since the establishment of the Museum's Archives Center in 1983, the number of users has doubled. The level of services available to fellows, researchers, and other staff is inadequate. The addition of a reference archivist will allow the Archives staff to provide increased access to holdings by referring users quickly and efficiently to their research interests in the collections. The archivist will also attend to the preservation and security of the collections while they are being used by researchers.

With the requested funds, the Museum will hire a reference archivist (1 workyear and \$32,000) and provide for supplies and travel support (\$2,000).

The addition of this position will enable the Archives Center to meet professional standards for reference services. Most important, it will help researchers use the Center's collections to their full potential for scholarly writing, exhibition, and educational purposes.

Columbus Quincentenary Program (1 workyear and \$250,000) - In 1986, the Museum began a five-year program of public symposia, archaeologically based exhibitions, and related publications. The program will develop a major permanent exhibition, "American Encounters," to commemorate the Columbus Quincentenary.

The exhibition will examine the results of Columbus's arrival in the Americas by exploring cultural interactions among Hispanics, native Americans, and Anglo Americans in the Rio Grande Valley of the American Southwest. The exhibition will emphasize the strategies devised by both native Americans and Hispanics to preserve the essence of their own cultures in the face of more dominant and complex cultures. In addition to the exhibition, NMAH will create a new Program in Hispanic-American Culture that will undertake research and produce publications and public programs on the development of Hispanic culture in the United States.

The Museum currently has a base of 2 workyears and \$125,000 to support its Quincentenary programs. The requested increase will enable the Museum to hire a collections management specialist to process accessions and loans for the exhibition. In addition, the expanded base of funding for the Columbus Quincentenary Program in FY 1991 will enable the Museum to:

- proceed with the design and development of "American Encounters," opening in October 1992;
- write scripts and produce an introductory film and video disc and audio-visual sequences for the exhibition;
- continue field research and collecting for the exhibition;
- plan, develop, and test curriculum kits and interpretive activities for the exhibition;
- present lectures, performances, and other public programs that demonstrate the nature and diversity of Hispanic-American culture.

The permanent exhibition and its related public programs will reinforce the Museum's commitment to new audiences. At the same time, the Smithsonian Institution will provide the general public with a more accurate presentation of America's multi-cultural past.

Duke Ellington Collection (5 workyears) - In March 1988, the Museum took possession of the Duke Ellington Collection, which contains thousands of pieces of music, hundreds of photographs, thousands of clippings, recordings, and other material collected by Duke Ellington himself over a 50-year period.

Primarily through contracted help, the Museum has preserved, catalogued, and opened the Collection to the public and scholars. Experts have begun cleaning and repairing fragile materials, microfilmed 77 deteriorating scrapbooks of press clippings, made copy negatives of more than 200 historical photographs, and re-recorded almost 500 phonograph recordings. The senior cataloguer has catalogued more than 2,000 individual pieces of music, representing 200 of an estimated 1,500 titles in the Collection. In April 1989, the Museum mounted a small exhibition on Duke Ellington, and more than twenty performances, lectures, and other public programs added to the exciting celebration of Duke Ellington's genius. The Museum plans include additional public programs, symposia, performances by outstanding college bands, and a major school-outreach activity.

The Museum requests 5 workyears for three archivists, a historian, and a research assistant. These positions are necessary to effectively continue the program's

curatorial, exhibition, research, and performing activities. NMAH will fund these positions with base resources currently dedicated to the Collection.

Permanent professional staff will retain familiarity with the collections. Professional continuity is the best guarantee to researchers and the public that program quality will stay consistently high. With these additions the Museum can more effectively and efficiently carry out its mandate to preserve, exhibit, and interpret the unique Duke Ellington Collection.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - This income is from various sources, including the Museum's share of museum shop and cafeteria sales, publications royalties, and various annual allotments. In FY 1990, these funds will support the salary and benefit costs for the museum director, various special events, and the unique chamber music performance and recordings program.

Restricted Funds - The principal sources of income for these funds are individual or corporate gifts and foundation grants provided for specific purposes. In FY 1989, NMAH received the following gifts and grants: from IBM, Digital Equipment Corporation, Xerox Foundation, Intel, and Electronic Data System for a major permanent exhibition entitled "The Information Age: People, Information, and Technology"; from Bruce Springsteen and the Recording Industry Association of America in support of a live performance program entitled "Music In America"; gift from the American Chemical Society for a feasibility study in support of the "Science in American Life" exhibit; from the Noxell Foundation and Campbell Soup to support oral history projects on advertising history; from the American Dental Trade Association for an exhibit on "Health in America"; from Invent America, Inc., for patent model collections; from the Association of Japan-United States Community Exchange for an exhibition on 19th-century life in America; from Smithkline Beckman Corporation and Erno Laszlo Limited, for the restoration of First Ladies' gowns; from the Pott Foundation to produce a film for the Museum's Hall of American Maritime Enterprise; from the Edward John Noble Foundation for programs on music and performances; and from Electronic Industries Association for an exhibition celebrating the 50th anniversary of television.

NATIONAL MUSEUM OF THE AMERICAN INDIAN

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	-	-	-	-	-	-	-	-	-	-
FY 1990 Estimate	69	6,000	-	-	-	-	-	-	-	-
FY 1991 Estimate	107	9,170	-	-	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The establishment of a National Museum of the American Indian (NMAI) will bring the collection of the Museum of the American Indian, Heye Foundation into the Smithsonian Institution. The new museum will offer a meeting place for scholars, a national facility for the exhibition of Indian art and artifacts, and a stage for the performing arts. It will provide curation and other learning opportunities for American Indian people and develop an active outreach program for managing traveling exhibitions and other museum services for communities throughout the Nation. The NMAI facilities will include a building of suitable size and design on the Mall at the foot of Capitol Hill east of the National Air and Space Museum; an exhibit and education center on the street-level floor of the old United States Custom House in New York City; and a research and storage facility at the Museum Support Center in Suitland, Maryland.

For FY 1991, the Institution requests resources for: fund-raising efforts for the National Museum of the American Indian facilities on the Mall and at the New York Custom House (11 workyears and \$670,000) and operations (27 workyears and \$2.5 million) above a base of 69 workyears and \$6.0 million. The Smithsonian is also requesting \$8,200,000 for preparation of the Custom House space, design of the Suitland building, and completion of planning for the Mall museum; justifications for these activities are in the Construction portion of this budget.

PROGRAM - The Museum of the American Indian, Heye Foundation, located in New York City, opened its doors to the public in 1922. The Museum's founder, George Gustav Heye, initiated the collection near the turn of the century as a result of expeditions in this country and in Ecuador, Mexico, the West Indies, the Amazon, and Central America. The Museum currently displays approximately 10,500 artifacts from a collection of nearly one million objects, with the remaining portion in storage. The collection is one of the world's richest assemblages of artifacts of the native cultures of the Western hemisphere.

The collections of the Heye Foundation and the Smithsonian complement each other. The Heye collection contains more late 19th- and 20th-century material than the Smithsonian's and includes an outstanding collection of Native American paintings.

Its North American Plains materials form one of the largest groupings found anywhere. The collection also includes artifacts of the great civilizations of the Inca, Aztec, and Maya, the remote forest tribes of the Amazon, and the Arctic Eskimo; Kachina dance masks, dolls, and baskets from the American Southwest; a 40,000-volume library; and a photographic archives with more than 80,000 negatives and prints chronicling Indian life. By adding to each other's strengths, the two collections are likely to inspire an exponential increase in Native American studies and a range of new ideas for exhibitions, research, and insight into historic and contemporary Indian culture.

Federal funding in FY 1990 will allow the Smithsonian to:

- develop plans for programs and collections management;
- provide central administrative services;
- provide care and custody of the collection;
- maintain and secure the existing buildings and temporary structures in New York;
- transfer existing museum employees;
- provide administrative costs to support the new Museum's Board of Trustees and cover expenses of its members who serve without compensation.

Funding in future years will enable the Smithsonian to continue and expand these activities and to build a museum on the last site on the Mall, an addition to the Museum Support Center to house those items not on display, and to renovate space for the George Gustav Heye Center at the old United States Custom House in New York. The Museum Support Center facility will house the collection in a protected environment, make objects available for research, and provide for conservation treatment as necessary.

EXPLANATION OF PROGRAM INCREASE:

Fund-raising Office (11 workyears and \$670,000) - The Federal legislation authorizing the establishment of the National Museum of the American Indian contains a requirement for matching construction appropriations with non-Federal funds. The staff of a new fund-raising office will plan and implement a national fund-raising campaign to secure the required matching funds from non-Federal sources. This campaign will be organized on the basis of fund-raising research and advice of consultants to attract both large and small gifts from a variety of sources.

The Institution requests resources to provide professional fund-raising personnel and technical and clerical support staff (11 workyears and \$471,000) for fund-raising efforts for the NMAI. The staff will design the campaign, identify and recruit volunteers, conduct research on prospective donors, and initiate prospective donor cultivation and solicitation activities. The requested funds also will support the operational costs for the fund-raising office (\$162,000) and consultant expenses, printing and reproduction, and promotional activities (\$37,000).

The campaign will benefit from efforts to seek donated goods and services to help alleviate additional requirements for Federal support in FY 1991. Prominent among

these efforts are attempts to obtain donated office space in an off-Mall location for the duration of the fund-raising campaign.

Program Operations (27 workyears and \$2,500,000) - Funds requested will enable the Institution to continue and advance the establishment of the NMAI. Additional funds requested above its \$6,000,000 base for FY 1990 will enable the Smithsonian to:

- (1) proceed with and expand preparations, which will include use of temporary facilities, for moving the Heye collection to Washington, D.C. (5 workyears and \$1,000,000);
- (2) recruit and hire key staff for the NMAI and proceed with program planning (8 workyears and \$500,000);
- (3) expand central administrative services (2 workyears and \$100,000);
- (4) conduct necessary staff training (\$150,000); and
- (5) prepare for initial Custom House operations by:
 - (a) developing exhibits (5 workyears and \$300,000);
 - (b) acquiring maintenance staff (3 workyears and \$150,000);
 - (c) initiating public programming (2 workyears and \$200,000); and
 - (d) arranging for security prior to public opening (2 workyears and \$100,000).

NONAPPROPRIATED SOURCES OF FUNDING: The Smithsonian has established an unrestricted account to receive donations for the NMAI. Investment income will be available from the Heye endowment which will be included in the transfer of Heye Foundation property. However, until the endowment becomes the property of the Institution, decisions regarding its management and funds generated cannot be made.

NATIONAL MUSEUM OF AMERICAN ART

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	119	5,464	-	59	3	692	-	297	-	-
FY 1990 Estimate	121	5,714	-	65	3	455	-	1,000	-	-
FY 1991 Estimate	129	5,978	1	194	3	548	-	654	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The mission of the National Museum of American Art (NMAA) is to acquire, preserve, study, and exhibit works of American art. Paintings, sculpture, graphic arts, and crafts--including photography and folk art--are within the scope of its collecting mandate. The Renwick Gallery, part of the National Museum of American Art, focuses upon American crafts, decorative arts, and design objects. The Museum also maintains the Barney Studio House, a period home open for tours and interpretive programs.

For FY 1991, NMAA requests an increase of 7 workyears and \$264,000 to provide additional research and professional support for the Painting and Sculpture Department (3 workyears and \$128,000); research and administrative support for the Renwick Gallery (2 workyears and \$78,000); collections management and utilization support (1 workyear and \$32,000); and the development of an exhibition commemorating the Columbus Quincentenary (1 workyear and \$26,000). In a joint request with the National Portrait Gallery, NMAA also requests 1 additional workyear for a safety and occupational health specialist for the American Art and Portrait Gallery Building, the Renwick Gallery, and the Barney Studio House.

PROGRAM - With a permanent collection of nearly 34,000 objects, the National Museum of American Art is a nationally recognized center for research, exhibitions, and public education in American art. NMAA acquires several hundred new works of art each year, and, due to limited space, objects from the permanent collection rotate from storage to exhibition in the galleries. The entire collection, however, is available for study or for loan to other exhibitors throughout the country. Conservation staff restore and preserve these irreplaceable artworks to ensure their availability for future generations. Scholarly research by the professional staff results in publications, exhibitions, and educational programs.

Researchers from a variety of disciplines use the Museum's extensive reference materials. The NMAA has developed and maintains three unique research data bases:

-- Inventory of American Paintings Executed before 1914 - data on more than

250,000 paintings by American artists in both public and private collections;

- Smithsonian Art Index - a list of artworks housed in the Institution's non-art museums;
- Index of American Art Exhibition Catalogues - documentation of artistic activities in the United States and Canada.

These inventories comprise more than 500,000 computer entries and constitute the most complete data base in existence in the field of American art. The newly launched Inventory of American Sculpture will ultimately add more than 100,000 records to the Museum's data base.

Collections - The Museum received a number of significant gifts during FY 1989, including sculpture by Augusta Savage and Bryan Hunt, an important large drawing by Luis Jimenez, and an assemblage by Rudy Fernandez. These works strengthen the Museum's modern and contemporary holdings. Works by Man Ray, Max Weber, Tom Wesselman, William Henry Jackson, and Irving Penn augmented the graphic arts collection.

New accessions have enhanced the Museum's folk art collection, including paintings by Howard Finster and William Hawkins and sculpture by Felipe Archuleta and Jose Delores Lopez, as well as gifts from Herbert Waide Hemphill, Jr. Other gifts include paintings by Irene Rice Pereira, John Koch, Edwin Dickinson, Mark Roeyer, and Louis Lozowick, and maquettes by Mary Miss and Stan Dolega created for the General Services Administration's Art-in-Architecture Program. Donations of works by Paul Bogatay and Margaret Craver have supplemented the Renwick Gallery's collection.

The Museum purchased Louis Comfort Tiffany's Market Day Outside the Walls of Tangiers, one of the earliest American canvases to introduce the Orientalist aesthetic to the United States. NMAA also purchased Bryan Hunt's Stillscape I to accompany its companion piece, which the Museum received as a gift. Both sculptures are on display in the American Art and Portrait Gallery Building courtyard. With support from the Smithsonian's Collections Acquisition Program, the Renwick acquired works by Dale Chihuly, William Daley, Wayne Higby, and Toshiko Takaezu. Other purchases include paintings, sculpture, graphic works, photographs, and craft pieces by artists representing the full breadth of American artistic achievement.

Publications - Smithsonian Studies in American Art, the Museum's scholarly journal, expanded to a quarterly schedule in 1989. Copublished with Oxford University Press and acclaimed since its debut three years ago, its circulation has reached 1,500. The Association of American Publishers, Inc., named the journal Best New Journal for 1989 in the Business/Social Sciences/Humanities category. The American Federation of Arts selected the journal for an Award of Excellence in its annual design competition.

MIT Press and NMAA copublished The Photography of Invention: American Pictures of the 1980s, which includes contemporary works by 90 artists. With the Smithsonian Institution Press (SIP), the NMAA published Paulanship in conjunction with an exhibition of Manship's work. In fall 1989, the Museum will publish The Patricia and Phillip Frost Collection: American Abstraction, 1930-1945 to accompany a major exhibition. Upcoming catalogues include two copublishing projects with SIP: a comprehensive study of Albert Pinkham Ryder, and Visual Poetry: The Drawings of

Joseph Stella. American Artists at the 19th-Century Paris Salons, which NMAA will copublish with Cambridge University Press, was the recent subject of a \$30,000 Getty grant.

The Museum and SIP are producing a postcard book with 24 full-color images from the Frost Collection. For the Manship exhibition, the publications office produced two brochures: The Art of Paul Manship and Mythology and the Art of Paul Manship. In addition, the Museum published two newsletters: American Art Forum Highlights and The American Art Network, the latter serving the community of former Smithsonian fellows and scholars throughout the world.

The Washington Book Publishers' 1989 Design Competition winners included a first-place award for the fall 1988 issue of Smithsonian Studies in American Art and awards for both Paul Manship and Perpetual Motif: The Art of Man Ray, copublished by the Museum and Abbeville Press in 1988. The American Association of Museums presented an Award of Distinction to the Lucas Samaras invitation during its annual publications competition.

Research Resources - In March 1988, NMAA began a nationwide appeal to solicit information for its newest research data base, the Inventory of American Sculpture. The Museum issued questionnaires to more than 12,000 museums, historical societies, and cultural institutions around the country. NMAA extended this solicitation in FY 1989, mailing questionnaires to more than 10,000 private collections. NMAA began the sculpture inventory with a core of 24,000 records developed through an FY 1987 pilot project. The inventory will ultimately survey all outdoor sculpture in the United States. NMAA and the National Institute for the Conservation of Cultural Property will conduct this survey in cooperation with the American Association for State and Local History, the National Conference of State Historic Preservation Officers, the National Park Service, and the Smithsonian's Conservation Analytical Laboratory. The joint effort of NMAA and its collaborator, the National Institute for Conservation, has raised more than \$1,000,000 of the \$3,000,000 fundraising goal for this project, including grants approved in FY 1989 from the Getty Grant Program (\$270,000) and the Pew Charitable Trust (\$850,000).

The Inventory of American Paintings Executed before 1914 will also benefit from the sculpture solicitation because the questionnaires include an appeal for new and updated information on paintings. NMAA's renewed contact with individuals and organizations that contributed information to this earlier research data base will enhance the Inventory of American Paintings for the 1,800 researchers who use this resource annually.

The Museum has preserved nearly 300 nitrate and deteriorated acetate negatives from its Peter A. Juley and Son Collection on stable film for future use. NMAA added more than 3,500 slides and 6,000 prints to its Slide and Photograph Archives in FY 1989. The total number of holdings now in the Museum's collection is nearly 120,000 slides and 250,000 prints and negatives.

Museum staff researched approximately 2,500 artists' names for the Artist Authority Project. This research ensures that the information on each recorded artist is accurate and identical among the seven data bases the Museum maintains. Mailings are in progress to request additional biographical information on selected artists.

Exhibitions - During FY 1989, the Museum exhibited works by individual artists

and assembled showings based upon thematic topics relevant to American art. Museum curators organized six exhibitions, all of which are touring or will tour to museums throughout the United States:

- "Perpetual Motif: The Art of Man Ray" explores the career of this famous surrealist artist, who worked in Europe and America during the first half of the 20th century, through a major retrospective of his paintings, photographs, sculptures, and assemblages (four venues);
- "The Art of Paulanship" reexamines the figurative subjects, animal sculptures, decorative works, miniatures, medals, and works on paper of this artist, whose work is experiencing a resurgence of popular and scholarly interest (eight venues);
- "The Boat Show: Fantastic Vessels, Fictional Voyages" shows the diverse ways in which artists interpret the ship and its journey in a range of contemporary crafts media, including glass, ceramics, wood, and clay (three venues);
- "The Photography of Invention: American Pictures of the 1980s" celebrates the 150th anniversary of the invention of photography with an assembly of contemporary works, primarily by young, avant garde artists (three venues);
- "The Patricia and Phillip Frost Collection: American Abstraction, 1930-1945" is the premier showing of the Frosts' major gift of paintings and sculpture by members of the American Abstract Artists group, donated to NMAA in 1987 (four-five venues beginning 1991);
- "Masterworks of Louis Comfort Tiffany," at the Renwick, emphasizes Tiffany's interpretation of natural forms in the design of stained-glass windows, lamps, vases, and other works produced as commissions, many of them exhibited to the public for the first time (two venues).

In FY 1989, the Renwick Gallery showed three exhibitions organized by other institutions: "American Art Pottery, 1880-1930 from the Cooper-Hewitt Museum" (toured by the Smithsonian Institution Traveling Exhibition Service); "Stephen deStaebler: The Figure" (toured by the Saddleback College Art Gallery); and "Bound to Vary: Billy Budd, Sailor" (toured by the Guild of Book Workers, Mount Holly, New Jersey).

In addition to exhibitions, NMAA curators organized two temporary installations: "Drawings from the Collection" and "Thomas Hart Benton and the U.S. Navy." "Images of Innocence: The Child in American Art" remained on view, and the Museum rotated miniatures for exhibition in the Doris M. Magowan Miniature Gallery. "Alice Pike Barney: The Paris Years" continued at the Barney Studio House. The Renwick installed new acquisitions from its growing permanent collection of contemporary American crafts, and NMAA remodeled and reinstalled galleries on its third floor. Both the Renwick and NMAA produced extended labels for major works in their permanent collections.

During FY 1989, NMAA lent more than 200 works from its collections to other museums throughout the United States and abroad, at the same time continuing its established policy of placing its European works on long-term loans to other institutions. Concluding a loan to the National Art Gallery of New Zealand in Wellington was a group of 17th- and 18th-century English and Dutch paintings, sent in

exchange for the loan to the Museum of John Singleton Copley's portrait, Mrs. Humphrey Devereux.

Projected exhibitions for FY 1990 include: "Slave Quilts from the Ante-Bellum South"; "Treasures of American Folk Art from the Cooper-Hewitt Museum: Training the Hand and Eye"; "George Ohr: The Mad Potter from Biloxi"; "Irving Penn Master Images" (co-organized with the National Portrait Gallery); "Albert Pinkham Ryder"; "Tradition and Innovation: New American Furniture"; "Visual Poetry: The Drawings of Joseph Stella"; and "American Folk: The Herbert Waide Hemphill, Jr. Collection."

The Museum continues research and preparation for the following exhibitions planned for FY 1991: "The West as America: 1820-1920," scheduled to open as part of the Smithsonian's Columbus Quincentenary program; "Tokens of Affection: The Portrait Miniature in America"; "Drawing with Color: Pastels of the 1980s"; "Homecoming: William H. Johnson and Afro-America, 1938-1945"; and, at the Renwick, "Contemporary American Studio Jewelry."

Interpretive Programs - During 1989, the Museum and its Renwick Gallery offered a diverse program of lectures, films, panel discussions, crafts demonstrations, seminars, family days, and workshops for teachers and students. In conjunction with Black History Month, these programs included a concert by the Howard University Jazz Ensemble accompanied by a lecture on the influence of jazz on 20th-century art, by Gwendolyn Everett; a poetry reading by E. Ethelbert Miller, director of the Afro-American Resource Center, Howard University; and an illustrated lecture, "Free Within Ourselves," presented by Dr. Regina A. Perry, professor of art history at Virginia Commonwealth University, Richmond.

In conjunction with the exhibition "Perpetual Motif: The Art of Man Ray," NMAA offered an all-day international symposium, "Dada and Surrealism: A Symposium in Honor of Man Ray," attended by more than 400 people. Participants included Dawn Ades, professor of art history and theory at the University of Essex in England; Michel Sanouillet, director of the Center du Vingtieme Siecle at the Universite de Nice in France; and Dickran Yashjian, chairman of the department of comparative culture at the University of California at Irvine. A \$25,000 grant from the Ebsworth Foundation supported this symposium. NMAA also offered four Man Ray films and a three-hour photography workshop for high school students and teachers.

In conjunction with the special exhibition "The Art of Paul Manship," NMAA presented a series of six lectures and offered two children's workshops on mythology, storytelling, demonstrations in clay, and hands-on sculpture making.

A variety of programs accompanied "The Photography of Invention" exhibition, including a series of four lectures, a computer demonstration by artist George Legrady, two photography workshops for students and teachers, and a workshop for visually impaired visitors.

NMAA conducted a workshop for 40 teachers attending the National Art Education Association convention in Washington, D.C. In June 1989, NMAA exhibited works of 1989 Presidential Scholars in the Arts and hosted a preview and opening reception.

During 1989, the Museum presented new interpretive programs designed to increase accessibility of two exhibitions. Visually impaired and other visitors could carry hand-held receivers through several sections of "The Photography of Invention" exhibition. These "sound sticks" relayed tape-recorded descriptions of selected works

in the exhibition. In conjunction with "The Patricia and Phillip Frost Collection: American Abstraction, 1930-1945," an interactive video program allowed visitors to see five artists at work and to hear their observations on the life of the abstract artist during the 1930s and 1940s.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, NMAA requests an increase of 7 workyears and \$264,000 to provide additional research and professional support for the Painting and Sculpture Department (3 workyears and \$128,000); research and administrative support for the Renwick Gallery (2 workyears and \$78,000); collections management and utilization support (1 workyear and \$32,000); and the development of an exhibition commemorating the Columbus Quincentenary (1 workyear and \$26,000). In a joint request with the National Portrait Gallery, NMAA also requests 1 additional workyear for a safety and occupational health specialist for the American Art and Portrait Gallery Building, the Renwick Gallery, and the Barney Studio House.

Research and Professional Support for the Painting and Sculpture Department (3 workyears and \$128,000) - NMAA's growing collection demands additional curatorial attention, study, and publication. Recent acquisitions, such as the Herbert Waide Hemphill Collection of American Folk Art and several other large collections, open new areas of emphasis within the collection. The current staff level is inadequate to assimilate effectively these acquisitions and develop accompanying program opportunities.

The requested funding will provide much-needed strength for the Museum's fundamental responsibilities to its collections and exhibitions and provide a broader approach to collecting and interpreting American art. This increase will provide funding for a recognized expert in 19th-century art to bolster the programs of the Painting and Sculpture Department. Currently, the department has six full-time and one half-time positions, of which only one curator has expertise in the broad range of 19th-century works. This additional position will:

- devote time to the care, maintenance, and study of the rapidly increasing collections;
- identify new opportunities for enhancing the collections;
- develop additional major exhibition programming in the specialty;
- increase the number of publications and public programs for the general public and scholarly specialists.

Further, the Painting and Sculpture Department currently has no research assistants for its many projects. The addition of two research assistants will enable the curatorial staff to devote more time to critical primary functions. These researchers will:

- track and maintain current market prices for works on acquisition priority lists and for other prospective acquisitions;
- maintain photographic record files for comparative purposes;
- help prepare and maintain informative gallery text for the general public;
- assist in preparing public programs sponsored by the department.

NMAA will use this funding to hire one curator (1 workyear and \$76,000) and two research assistants (2 workyears and \$52,000). The Museum will provide support funds for these positions from within its base.

Curatorial activities at NMAA serve a wide variety of scholars, students, collectors, and a growing number of the general public. It is imperative that those activities keep pace with the rapidly expanding collection.

Research and Administrative Support for the Renwick Gallery (2 workyears and \$78,000) - The Renwick Gallery is dedicated to collecting, exhibiting, and interpreting American crafts, decorative arts, and design. Its mission requires it to take initiatives in crafts research and to provide leadership for the Institution in the crafts field. The Renwick's recent recognition as a center for significant research and major exhibitions presents valuable opportunities for the Institution and the Gallery. The requested funding will enable the Renwick to extend its scholarship in contemporary American crafts. By exploring this unique facet of the Smithsonian collections, the Renwick can further establish its prominence in this art form. The addition of both a curator and an administrative assistant will strengthen the Gallery's research in American crafts and enhance its ability to respond to audience and research needs in this field.

With this funding, NMAA will hire a full-time curator to assist the curator-in-charge in all areas of research, acquisitions, collections review, exhibitions, and interpretive programming as related to American design and crafts. NMAA also will hire a full-time administrative assistant to perform a variety of duties related to budget, personnel, procurement, and travel. With an administrative assistant to assume these responsibilities, the curator-in-charge can more effectively attend to the artistic and scholarly programs of the Gallery.

NMAA will use this funding to cover salary and benefits costs for one curator (1 workyear and \$46,000) and one administrative assistant (1 workyear and \$32,000).

The Renwick Gallery is embarking on a new and important phase of its development as a leader in the field of American crafts. It is vital to its success that it receive the support it needs to undertake a concentrated research effort in the field and effectively manage its rapidly expanding crafts collection.

Collections Management and Utilization Support (1 workyear and \$32,000) - Since Institution-wide inventory of collections, it has been a high priority for the Smithsonian to keep its collections records current. In recent years, NMAA has added significant collections of folk art, photography, modern realism, and abstract art to its holdings. During this growth phase, the Museum has had no increase in support for cataloguing and object control. This insufficient support has created a serious collections management deficiency that the Museum cannot remedy with its existing base resources. Presently, many objects in the Museum's collections remain uncatalogued. Complete records of each artifact should include information on the object and the artist, as well as its location in the collections. This information is necessary to ensure sound collections management policy and to make the collections accessible to staff and scholars for research.

NMAA will use the requested funding to cover salary and benefit costs for a museum specialist to assist curators in cataloguing newly acquired objects, to eliminate the long-standing backlog in the graphics collection, and to improve object

control. With additional staff, NMAA will be able to maintain an effective collections management policy in accordance with the standards mandated by the Institution and to use the collections more effectively to disseminate information and facilitate research.

The collections are the foundation upon which research, exhibition, and education programs rest. The Museum augments its collection by as many as 1,000 paintings, sculptures, and graphics each year. While the Museum has made great strides in resolving collections management deficiencies, the increasing need for cataloguing and object control remains of serious concern and requires the immediate attention of a collections management specialist.

Development of an Exhibition Commemorating the Columbus Quincentenary (1 workyear and \$26,000) - Columbus's voyage to the New World set in motion westward exploration and settlement. In the 19th century, expansion transformed the American landscape, forever altered the fates of both newly arrived and native Americans, and profoundly changed the Nation's democratic institutions and ideals. The Museum's Quincentenary exhibition, "The West as America: 1820-1920," will present artworks and cultural objects that portray the dreams that inspired westward expansion and the complex legacy of experience those dreams engendered.

Examining all aspects of the settlers' encounter with a new land and its people, the exhibition and accompanying book will use paintings, sculpture, graphic arts, printed books, and collateral materials to show how the receding frontiers of the West assumed a mythic attraction for Americans between 1820 and 1920. The show will highlight an especially rich area of Smithsonian collections, including major works by George Catlin, Charles Bird King, John Mix Stanley, and Thomas Moran. The exhibition will explore the dual nature of the settlement of the West, both the positive aspects of development and the problems and dislocations, physical and cultural, that attended this intrusion into nature's wilderness and the encounter with its native inhabitants. New research into the intentions and accomplishments of the explorers and early settlers will expand understanding of the westward impulse and the art and cultural history of the American West.

The Museum currently has a base of \$25,000 to cover support costs for the initial research and planning of this exhibition. The requested increase will allow the Museum to hire a research assistant to guarantee the timely completion of research needed during the period of preparatory work. The research assistant will help the NMAA curatorial staff locate and compile material critical to the development of the major book and exhibition. This increase will also permit the Museum to purchase a computer to use during this research. NMAA will need the requested funding through FY 1992.

Additional support for this exhibition will ensure that NMAA makes a significant contribution to the Smithsonian's Columbus Quincentenary celebration.

Safety and Occupational Health Specialist, Office of the Building Manager, American Art and Portrait Gallery Building (1 workyear) - The National Museum of American Art requests, with the National Portrait Gallery (NPG), 1 workyear to establish a new position of safety and occupational health specialist in the American Art and Portrait Gallery Building's Office of the Building Manager. The specialist will be responsible for managing the safety program for the staff, visitors, and volunteers in the American Art and Portrait Gallery Building, the Renwick Gallery, and the Barney Studio House.

NMAA and NPG must have a full-time safety position responsible for correcting health and safety hazards that pose potential threats to the public and staff. Furthermore, new regulations from the Occupational Safety and Health Administration (OSHA), the Environmental Protection Agency (EPA), and the National Fire Protection Association (NFPA) state that museums must have specialized guidance if they are to remain in compliance with current codes. Presently, the overall management of the safety and occupational health program in the American Art and Portrait Gallery Building is barely adequate. The respective administrative officers of NMAA and NPG have shared safety duties on a part-time basis, but other primary duties prevent them from effectively organizing a program that meets the standards of the Smithsonian's Office of Environmental Management and Safety.

The safety and occupational health specialist will:

- serve as technical advisor on safety-related issues;
- evaluate the level of safety and environmental health at the Museum;
- initiate corrective action if needed;
- ensure compliance with all applicable codes and standards;
- develop and present safety-training programs;
- conduct investigations into accidents;
- chair safety committee meetings;
- serve as a representative to outside safety committees;
- train staff in emergency procedures;
- conduct fire drills;
- serve as hazard communications coordinator and hazardous waste coordinator;
- develop and update emergency self-protection plans for NMAA and NPG.

NMAA and NPG request 1 workyear for this position. NMAA and NPG will pay the salary cost for this position from existing base resources in the American Art and Portrait Gallery Building Manager's budget. NMAA and NPG will redirect funds from lesser priority Building Manager operations to cover this urgent Federal and Institutional mandate.

A safety and occupational health specialist is necessary to eliminate health and safety hazards that pose potential threats to the public and staff. The specialist will also bring the facilities of the American Art and Portrait Gallery Building into compliance with Federal regulations. This responsibility can no longer be effectively managed on a collateral duty basis by other staff without affording it much less than the serious attention it deserves.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Annual Smithsonian allotments and fees for services provide these funds. Examples of fees received are:

- sale of deaccessioned works of art;
- royalties from publications;
- exhibition participation fees;
- revenue shares from restaurant and gift shop sales;
- sales of slides and photographs;
- tuition reimbursement from universities for NMAA interns.

During FY 1989, funds from the J. Paul Getty Center for the History of Art and the Humanities continued to support the archival preservation of the Juley Collection of photographs. Exhibition fees allowed the employment of one full-time staff person in the registrar's office to coordinate NMAA loan activities. During 1989, exhibition fees also funded assembly costs of the Man Ray exhibition. Tuition reimbursements received from universities enabled NMAA to provide stipends for 11 summer interns in 1989. NMAA also took temporary measures to prevent further damage to the Barney Studio House after structural tests found evidence of deterioration in 1988. Funds from the Smithsonian's Collections Acquisition, Scholarly Studies, Research Opportunity, and Special Exhibition Funds supported research, education, and exhibition programs.

Restricted Funds - Individuals, foundations, and corporations provide funds for specific purposes. A generous gift from the Renwick Collectors' Alliance in 1988 helped initiate the James Renwick Fellowship Program in American Crafts. The Institution awarded two fellowships in 1988 and two in 1989 to outside scholars for study at NMAA. In FY 1989, the Renwick Alliance also supported a four-month curatorial fellow (\$5,000) and committed to a one-year position for a collections acquisition assistant (\$30,000). The Renwick Alliance donated additional funds for the purchase of works of art (\$30,000). The Museum used funds generated through the American Art Forum to purchase the painting Market Day Outside the Walls of Tangiers, by Louis Comfort Tiffany. NMAA received contributions from several sources for the programs associated with "The Photography of Invention" exhibition. Tiffany & Company provided funds for the Tiffany exhibition, which will open in September 1989.

NATIONAL PORTRAIT GALLERY

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	87	4,131	-	25	-	56	-	105	-	-
FY 1990 Estimate	88	4,304	-	41	-	78	-	559	-	-
FY 1991 Estimate	90	4,538	-	42	-	60	-	773	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Portrait Gallery (NPG) is dedicated to the exhibition and study of portraits of people who have made significant contributions to American history and of the artists who created such portraiture.

For FY 1991, NPG requests an increase of 2 workyears and \$234,000 for support of the Columbus Quincentenary exhibitions (\$50,000); migration of the Catalog of American Portraits (CAP) records and NPG collection records from SELGEM to the IBM system (1 workyear and \$61,000); reconfiguration of permanent and archival collections files (1 workyear and \$105,000); and membership in the RLIN library automation system (\$18,000), which is part of an Institution-wide initiative coordinated by the Office of Information Resource Management (OIRM). As a joint request with the National Museum of American Art, NPG also requests 1 workyear for a safety and occupational health specialist for the American Art and Portrait Gallery Building's Office of the Building Manager. This last request appears in the line-item for the National Museum of American Art.

PROGRAM - The National Portrait Gallery explores the heritage and accomplishments of the American people by collecting, studying, preserving, and exhibiting portraits in all media as both historical and artistic documents.

As NPG's collections have expanded, research into American political, social, and intellectual history and the history of American art has substantially increased. These research results, published by curators and historians and using the portraits acquired and the works brought to Washington, D.C., in special exhibitions, appear in books and journals of permanent scholarly value. Temporary exhibitions in the Gallery frequently present subjects or artists never before explored, and bring together works from public and private collections for display with objects in the Gallery's permanent collections. Professional conservators on the Gallery's staff care for the collections of the National Portrait Gallery.

The Gallery has maintained an active and successful program in recent years without substantial increases in budget or staff. As the 1990s begin, the Gallery will face new challenges in maintaining its acquisition activity in the face of

increasing art prices, housing its collections in an orderly and safe manner, and managing its records. The Gallery will require additional funding to support its growing collections and necessary expansions in its curatorial, registrarial, and educational programs.

Collections Acquisitions - During FY 1989, a bronze bust of President George Bush by sculptor Marc Mellon augmented the NPG Presidential portrait collection. The bust was a gift from Vincent and Sheila Melzac.

A major gift to the collection was a portrait of Bishop George Berkeley. Acquired through a grant from the Morris and Gwendolyn Cafritz Foundation, the portrait has special significance not only because it dates from the time when Berkeley was attempting to carry out his New World plan but also because it was the work of colonial artist John Smibert, who accompanied Berkeley to America as the artist designated to teach painting and drawing at the Bermuda school. Other major gifts include the Rene Bouche portrait of Benny Goodman from Mr. Goodman's daughters, three self-portraits in different media by Victor Hammer, and "The Family," a highly important, limited edition portfolio of 73 portraits by Richard Avedon, commissioned by Rolling Stone magazine, of the men and women who constituted America's political leadership in 1976. Generous contributions from Mrs. J. Paul Austin and the James Smithson Society funded the acquisition of the Avedon photographs.

Through purchase, the Gallery acquired Cephas Thompson's portrait of William Wirt, U.S. attorney general for 12 years in the Andrew Jackson administration, as well as busts of the writers A. Bronson Alcott and J. P. Marquand, a bronze bust of former Institution Secretary S. Dillon Ripley by Walker Hancock, portraits of Gertrude Stein with Alice B. Toklas by Sir Francis Rose, and the artists Jacob Epstein, Ernest Lawson, Mark Tobey, and Thomas Seir Cummings.

The Prints and Drawings Department acquired a number of significant portrait drawings in FY 1989, including Sally Avery's drawing of Milton Avery; Boardman Robinson's image of John Reed; self-portraits by Theodore Roszak and Stanton MacDonald-Wright; an English watercolor of Edward Sothorn; pencil drawings by Miriam Troop of James Farrell, Howard Rusk, A. Philip Randolph, Joseph Hirshhorn, and Ellsworth Bunker; and crayon portraits by Hugo Gellert of Ethel and Julius Rosenberg, Mary Heaton Vorse, Gilbert Grosvenor, and others. The Gallery also acquired several groups of caricature drawings, including four works by Charles Johnson Post, 11 drawings by Peggy Bacon, six by Antonio Sotomayor, eight by Will Cotton, and 33 by David Levine, as well as one piece by Paolo Garretto. Several portraits of important African-American subjects now enhance the collection, including a lithograph of Henry Bibb, a drawing of Katherine Dunham, and posters of Jack Johnson and Dorie Miller. Other posters acquired include images of Alla Nazimova, Will Rogers, Veronica Lake, Lon Chaney, and John Gilbert. Among other important print purchases were a lithograph of Theodore Dreiser by Adolf Dehn, an etching of George Washington by Joseph Hiller, Jr., and a lithograph depicting Rouben Mamoulian by Don Freeman.

In addition to many smaller gifts to the collection, the Gallery received five drawings by Boris Chaliapin, a painted poster by Batiste Madalena, a pastel by Antonio Sotomayor, and a lithograph by Alexander Brook.

Major photographs purchased for the Gallery's collection in FY 1989 include a unique, life-size Polaroid Polacolor self-portrait of contemporary artist Lucas Samaras; a rare vintage print of Gertrude Stein and Alice B. Toklas taken in Stein's Paris home by Man Ray in 1923; a daguerreotype of future outlaw Jesse James at the age

of three as well as a tintype portrait of the adult James from 1870; a vintage platinum print portrait by Alice Boughton of poet and reformer Julia Ward Howe; a daguerreotype of artist Charles Loring Elliott attributed to Mathew Brady; a handsome, vintage portrait of artist Louise Nevelson by Lotte Jacobi; Paul Haviland's rare, cyanotype portrait of photographer Alfred Stieglitz from 1910; an informal view of photojournalist Arthur Fellig (better known as "Weegee") by news photographers Bert Brandt and Edward Jerry; and a dramatically posed, vintage silver print of evangelist Aimee Semple McPherson taken at the Gerhard Sisters' studio in St. Louis in 1923.

Several significant gifts also enhanced the Gallery's photographic holdings in FY 1989. A gelatin silver print of author Lillian Hellman by Marianne Cook joined the collection as a gift of the photographer, while an anonymous donor gave a portrait of author James Jones by Nancy Crampton. A 1948 vintage portrait of public official David E. Lilienthal came as a gift from the family of Mr. Lilienthal.

Collections Management - In the summer of 1989, NPG undertook an extensive drawings conservation inventory to review the housing and conservation needs of framed drawings. This project has been pending since the transfer of drawings to the Prints and Drawings Department several years ago. In the course of the inventory, NPG has rehoused a large number of drawings, identified several conservation emergencies, and made plans for the systematic rehousing and reframing of the majority of drawings.

The registrar's office continues to settle into its new office spaces. It has started reorganizing exhibition and outgoing loan files and will receive cabinets for this project in FY 1990. The registrar's office continues to make additional use of microcomputers. NPG uses computer data bases to monitor pending acquisitions in its custody, to record outgoing loans, to track the location of objects on view in the museum, and to create completed catalogue cards. Museum staff routinely enters new collections records in the data base. In-house automation of older inventory records continues to be a priority, but staff vacancies have hampered this effort. Meanwhile, the Gallery relies on the Smithsonian's central computer for its complete collections records.

NPG renovated the packing and shipping room in FY 1989 to make maximum use of the available space. Card readers at entrances to collection storage areas within the Museum and in other "sensitive" workspaces now enhance security of these areas. Due to lack of staff and funding, NPG has delayed the curatorial archival files transfer project. The Museum is researching space-efficient cabinets, and a vendor will make recommendations within the next year.

Exhibitions - The National Portrait Gallery and the Museum of Broadcasting in New York co-organized "Pioneers of American Broadcasting" in October 1988. The exhibition featured inventors, entertainers, writers, and newscasters who had a significant impact on radio and television history. In addition to portraits and memorabilia, the exhibition included excerpts from radio and television programs played on monitors located throughout the galleries.

As part of its celebration of the Bicentennial of the Constitution, the Gallery joined the United States Senate and the United States House of Representatives in presenting "The First Federal Congress, 1789-1791," from March through July 1989. Senator Robert Byrd, Representative Lindy Boggs, and Secretary Robert McC. Adams opened this exhibition at a special reception attended by many members of Congress. The Bicentennial Commission of the U.S. Constitution, the firm of Donaldson, Lufkin &

Jenrette, and the Equitable Life Assurance Society of the United States contributed partial funding for the exhibition.

"Isamu Noguchi Portrait Sculpture," the first major retrospective of this important but little-known aspect of the artist's work, opened in April 1989. Favorably reviewed in the national press, this exhibition went to a branch of the Whitney Museum in New York after its Washington closing in August.

To commemorate the 200th anniversary of the Act of Congress establishing the Federal judiciary system, "Portraits of the American Law" will open in October 1989. This exhibition features images of distinguished American jurists from the years of the early republic to the late 20th century. The primary purpose of this exhibition is to highlight those individuals who were pivotal interpreters and shapers of the U.S. legal system. Three national law firms have provided partial support for the exhibition: Morgan, Lewis & Bockius, Counselors at Law; Vinson & Elkins, Attorneys at Law; and the Kirkland & Ellis Foundation.

Opening in late October 1989 and continuing through March 1990, "To Color America: Portraits by Winold Reiss" will feature images of various ethnic groups, particularly African Americans and native Americans, by the German-born artist Winold Reiss. The Gallery is creating a new exhibition area for this show by using a first floor central hallway and several adjacent rooms. The Burlington Northern Foundation, the Anschutz Foundation, and the Smithsonian Special Exhibition Fund have supported the exhibition. The Smithsonian Institution Traveling Exhibition Service (SITES) will tour a panel version of this show.

Two major photographic exhibitions will open in the spring of 1990. The first is a joint exhibition with the National Museum of American Art (NMAA) of the 120 master photographs given to the two museums by Irving Penn. NPG and NMAA are developing plans to circulate this exhibition in the United States and abroad. The second is a selection of the photographic treasures from the National Portrait Gallery collection.

NPG will reinstall the Hall of Presidents in the spring of 1990 to accommodate recently acquired portraits. At the same time, an exhibition of Presidential caricatures by Pat Oliphant will open, along with new installations of the Meserve and TIME galleries.

The last in the Gallery's series of exhibitions commemorating the Bicentennial of the Constitution will open in October 1990. Co-organized with the Tennessee State Museum in Nashville, this exhibition will focus on the executive branch of government through an examination of the life and presidency of Andrew Jackson. The exhibit will travel to Nashville.

Other major exhibitions currently in development are an exhibition focusing on the artists and journalists who covered World War II (1991), a joint exhibition with the Wadsworth Atheneum in Hartford, Connecticut, and the Amon Carter Museum in Fort Worth, Texas, on the portraits of Ralph Earl (1991), and a major retrospective of the works of Cecilia Beaux (1992). NPG is planning two exhibitions as part of the Columbus Quincentenary observance. In the first exhibition, NPG is joining with the Prado Museum in Madrid and the Kimbell Art Museum in Fort Worth, Texas, in organizing an exhibition that will concentrate on 16th-century Spanish portraiture. The exhibit also will focus on the creation of an indigenous Spanish portrait style from the time of Ferdinand and Isabella through the age of Philip II, the era when Spanish colonial influence in the Western Hemisphere was at its height. Several museums in Europe will

loan their portrait masterpieces for this exhibition. In the second Quincentenary exhibition, NPG joins the National Museum of American Art to present, in the spring of 1993, an exhibition based on the American paintings and sculptures originally shown in the 1893 World's Columbian Exhibition in Chicago.

Loans from the National Portrait Gallery to museums around the world continue to increase. Due to the many international celebrations of the 150th anniversary of photography, loans from that collection have been particularly heavy, with items going as far as Czechoslovakia and Australia.

Publications - The National Portrait Gallery's publications department produces books and ephemera documenting the museum's collections and exhibitions for a general adult reading public. Exhibitions have been the focus of this activity in 1989, most notably with the publication of The First Federal Congress, an in-depth study of this landmark in history. This department has also completed, or initiated, work on four other exhibition-related books and various brochures. The Smithsonian Institution Press is distributing all but one of the books--Portraits of the American Law--which, in a new venture for the National Portrait Gallery, the University of Washington Press will distribute.

Of special interest in 1990 will be the catalogue for the Irving Penn photograph collection, produced to document the artist's gift to the National Portrait Gallery and the National Museum of American Art. This will be a collaborative project between the two museums, and the Smithsonian Institution Press will distribute the catalogue.

Education - The education department of the National Portrait Gallery combines a schedule of daily gallery tours, intensive elementary and secondary school programs, and senior citizen outreach programs. Trained education aides and docents conduct these tours and outreach programs. NPG's education program menu includes slide-lecture presentations such as "Yet Do I Marvel" (a look at African-American literary artists from the 18th century to the present) and "FDR: A Rich Legacy" and musical performances such as "A Tribute to Cole Porter." NPG has developed programs to address the needs and interests of multi-ethnic communities nation-wide and to broaden audiences locally.

"Cultures in Motion: Portraits of American Diversity" (CIM) promotes serious reflection on portraiture, biography, and history through lectures, symposia, one-person biographical plays, recitals, concerts, storytelling, and other performance media. A successor to the former "Portraits in Motion," CIM's activities are a constructive way for museum visitors to broaden their understanding of the multi-cultural aspects of American history.

The Museum has developed a brochure to invite "mobile seniors" who have access to transportation to spend a morning or an afternoon at the National Portrait Gallery. The goal is to reach older people living within two hours of the District of Columbia. NPG is conducting further research to develop supplemental education packages for teachers nation-wide and a self-guiding brochure for families with young children. NPG must complete the development work and acquire funding for these new publications.

The education department offers a Lunchtime Lecture Series related to the Gallery's special exhibitions and highlights the permanent collection through speakers bureau slide-lectures on themes such as "Leading Ladies: Women and Reform in the United States" and "Men of Progress: Nineteenth-Century American Inventors." The

department is also responsible for coordinating the National Portrait Gallery's internship program.

Research - The Catalog of American Portraits (CAP) continued to serve researchers in the fields of American history and American art history during FY 1989. Research requests increased in number and complexity over previous years. CAP added portrait records from the Midwest and California to its computer data base, bringing the total number of automated records to approximately 54,000. Participating institutions received automated printouts and accompanying negatives covering their portrait collections. With the receipt of a generous grant from the Smithsonian Institution Women's Committee, CAP researched and updated information on some 6,000 portraits in the southern United States.

In cooperative research efforts, CAP shared its information concerning approximately 2,500 portraits of native Americans with the National Museum of Natural History's native-American programs and assisted the National Museum of American History's Division of Military History in the study of military uniforms as depicted in 18th- and 19th-century portraits. The Smithsonian Institution Collections Information System (CIS) will incorporate information from these research projects. CAP continues to play an active role in the development of this information system.

CAP's first priority in the coming fiscal year is to continue to serve research interests, both professional and private. After filling two office vacancies (including a new field surveyor), CAP expects greater progress in the collection and processing of research material. CAP will continue to seek funding for the completion of the national portrait survey.

During FY 1989, the Peale Family Papers staff continued its work of transcribing, researching, and annotating the selected papers of the noted artist and naturalist Charles Willson Peale and his artist-sons Raphaëlle, Rembrandt, and Rubens. The staff now has volume 3, The Artist on His Farm, 1810-1820 ready for the Yale University Press, with publication scheduled for April 1991. Work has begun on volume 4, which will cover the years 1820-27, and on Charles Willson Peale's autobiography (volume 5), both scheduled for publication in 1993. NPG also plans to publish a volume of critical essays on the life and work of Charles Willson Peale, to appear in April 1991 in celebration of the artist's 250th birthday.

The project's research program to identify the portraits painted by Rembrandt Peale (1778-1860) and to collect information about the extensive work of this important American artist is successfully under way. Publication of the catalogue raisonné of Rembrandt Peale's total oeuvre will meet scholarly needs in the art historical world. An exhibition of Rembrandt Peale's portraits will follow the completion of the catalogue.

The National Museum of American Art/National Portrait Gallery Library has continued to provide a full range of services to its readers despite continued personnel shortages. An unusually large number of fellows and interns used the Library during FY 1988 and FY 1989. In addition, the Library gave tours and orientations to groups both within the Smithsonian and from outside the Institution.

The Library staff has almost completed a full stack inventory in preparation for the automated circulation system due to begin in FY 1990. NPG conducted its most recent stack inventory in 1983. The staff also has developed an automated system for tracking interlibrary loans and produced a guide to Library policies and procedures

that will be distributed to Smithsonian staff and fellows. To help develop a program to improve the publication exchange project, the Library staff received a Research Opportunities Fund grant.

At the "Periodicals Swap" at the Annual Conference of Art Libraries Society/North America in Phoenix in March 1989, the Library obtained many important missing periodical issues. Other additions to the Library collection in FY 1989 included New York Public Library Artists' File (microfiche), American Biographical Archive (microfiche), New York Evening Post, 1829-71 (microfilm), and files of the periodicals The Nineteenth Century: The Visual Arts, and Architecture Specialist Collection (microfiche).

The Library's Bibliography on Portraiture will be published by G. K. Hall in 1990. This printed book catalogue lists books, book chapters, periodical articles, and selected monographs on portraiture. Covering portraiture as both an art form and documentation in all epochs of civilization, it will serve the needs of scholars and institutions here and abroad. A project to fund the archival processing and indexing of the Ferdinand Perret Papers, a scrapbook collection on California art and artists, is in the proposal stage. The Library is eagerly awaiting the publication of the NPG checklist on CD-ROM. The CD-ROM reader will be located in the Library for various uses by the Gallery.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, NPG requests an increase of 2 workyears and \$234,000 for support of the Columbus Quincentenary exhibitions (\$50,000); migration of the Catalog of American Portraits (CAP) records and NPG collection records from SELGEM to the IBM system (1 workyear and \$61,000); reconfiguration of permanent and archival collections files (1 workyear and \$105,000); and participation in the RLIN library automation system (\$18,000), which is part of an Institution-wide initiative coordinated by the Office of Information Resource Management (OIRM). As a joint request with the National Museum of American Art, NPG also requests 1 workyear for a safety and occupational health specialist for the American Art and Portrait Gallery Building's Office of the Building Manager. This last request appears in the line-item for the National Museum of American Art.

Columbus Quincentenary Exhibitions (\$50,000) - The 1992 Columbus Quincentenary presents a once-in-a-lifetime opportunity for American scholars and the public to explore the founding of the Americas. Of all the historical records available from the 15th and 16th centuries, the medium that can speak most vividly to many contemporary audiences is portraiture from that era. The collections of the National Portrait Gallery are among the richest assets of the Nation's art and history collections. NPG will contribute its extensive collections and unique expertise in the fields of portraiture, exhibition organization, and publication direction to the Quincentenary celebration by focusing on the people of that era whose decisions and accomplishments have in turn shaped the 20th century.

NPG will present two exhibitions and two research publications to commemorate the Quincentenary. The first involves a significant research initiative in collaboration with two internationally important museums, the Kimbell Art Museum in Fort Worth, Texas, and the Prado Museum of the Ministry of Culture in Madrid, Spain. "Spanish Portraiture in the 16th Century" will feature portraits from the age of King Philip II, when Spanish colonial influence in the Western hemisphere was at its height. This exhibition will feature portraits on loan from the Prado in Spain, the Kunsthistorisches Museum in Vienna, Austria, and the British Royal Collections. This exhibition will be on view in 1992 in Washington, D.C., and in Fort Worth. NPG and

its partners also intend for this exhibition to tour other venues, including Spain. The catalogue for this exhibition will appear in both English and Spanish. Funding needs will continue into FY 1993 as the exhibition travels to other venues. The second Quincentenary exhibition, "Chicago Columbian Art Exhibition," involves significant new research in art history conducted by NPG and the National Museum of American Art. This exhibition, based on works originally shown in Chicago at the 1893 World's Columbian Exhibition, will be on view in FY 1993. NPG expects no need for funding beyond that fiscal year.

The National Portrait Gallery currently has a base of \$15,000 to support these Columbus Quincentenary exhibitions. The requested increase will expand this base to continue the research and planning for the two exhibitions. The increase will allow the guest curator (from the Kimbell Museum) to travel extensively to find portraits appropriate for the exhibition and to arrange exhibition sites (\$40,000) and support the costs of contractual services (\$10,000).

The nationwide series of events centered around the Columbus Quincentenary present unique opportunities for international cooperation among institutions and scholars. With its own collections, and through its partnership with other preeminent museums, NPG will interpret the figures and events of the Columbian era and their subsequent impact on the historical and cultural developments of 20th-century America.

Migration of the Catalog of American Portraits (CAP) Records and NPG Collection Records from SELGEM to the IBM System (1 workyear and \$61,000) - The records of CAP and the NPG collections contain invaluable information concerning portraits of notable Americans. Having NPG collections information and research data on an on-line system that all Smithsonian bureaus can share will greatly enhance the Gallery's ability to work with the data for collections management and research. A shared system will allow NPG to access the collections information of other Smithsonian bureaus. Staff, scholars, and the general public will benefit from this source of information and its retrieval capabilities.

Currently CAP and NPG collections records are on the Honeywell mainframe. Because of economic and technical problems in maintaining the Honeywell computer, CAP and NPG records must move from the Honeywell to the IBM mainframe. The move will involve reconfiguring data from the SELGEM system to Smithsonian's Collections Information System (CIS), an Institution-wide data base that encourages the national and international exchange of collections information among Smithsonian bureaus and museum colleagues.

NPG requests funding to design and implement a CIS program for CAP and NPG data. NPG will use these funds to contract for software design services and pay for the resulting software and report package designed exclusively for NPG user needs (\$40,000). NPG will also hire a data entry clerk (1 workyear and \$21,000) to reconfigure, edit, and enter data into the new system.

The Catalog of American Portraits and NPG's collections records contain information concerning American history and culture that is valuable to scholars and the general public alike. For this information to be accessible to researchers and Smithsonian staff, NPG must convert its computer system and transfer the records.

Reconfiguration of Permanent and Archival Collections Files (1 workyear and \$105,000) - The value of NPG's collections is escalating rapidly with the overall inflation in art markets and the increasing rarity of specific objects in NPG custody.

Reconfiguration of NPG's archival collections is necessary to secure essential records on the collections. The security and integrity of the files are essential for responsible collections management. This request is the result of a mandate from the Smithsonian's Office of the Inspector General (formerly Audits and Investigations), and NPG must be responsive to this directive.

Permanent and archival files on the NPG collections must be more securely safeguarded than is possible with existing resources. In case of theft, disaster, or damage to the collections, the information in these files is crucial for insurance and recovery. Registrars and curators require ongoing access to this material, so NPG must coordinate the functional needs of these offices with the need for greater security and control of the records.

The requested funds will enable NPG to hire a museum technician (1 workyear and \$21,000) to assist in copying and labeling and to provide clerical support, and to contract for registrarial support services, including the examination and distribution of files (\$32,000). The funds will also support new compact filing units (\$40,000), and a computer, the rental of a copying machine, and supplies necessary for the project (\$12,000).

Responsible collections management is imperative for every museum. NPG must provide greater security for its archival records to fulfill its public-trust obligations and comply with the mandate from the Office of the Inspector General.

Membership in the RLIN Library Automation System (\$18,000) - The Research Libraries Information Network (RLIN) is the Research Libraries Group's (RLG) data base, an international information management and retrieval system designed to collect, organize, preserve, share, and access research materials. Members include almost all of the major art libraries such as the Metropolitan Museum of Art, the Art Institute of Chicago, the Cleveland Museum of Art, and the Getty Center. At the Smithsonian, the Sackler-Freer Library is presently a member of RLIN, and the Archives of American Art will join within the year. Membership in RLIN will enable the National Museum of American Art/National Portrait Gallery Library to share its unique resources with other scholars throughout the world and provide access to many resources and programs offered by RLG, such as collections management and preservation. The Library will share these benefits with Smithsonian staff, fellows, and visiting scholars.

The Library will use the requested funds to become an associate member (Arts and Architecture) of RLG and to participate fully in RLIN. In addition to providing the Library access to the acquisitions, searching, cataloguing, and interlibrary loan system of RLIN, membership in RLG will also enable the Library to participate in the decision-making process of this group of institutions that are working to advance education and scholarship in the academic research community.

The requested funds will also support operating costs, particularly the initial addition of 45,000 records to the RLIN data base and annual increases of approximately 4,500 titles. Acquisition records must be transferred to the RLIN system, as well as interlibrary loan records. These records are presently in the OCLC (Online Computer Library Center, Inc.) national data base of library holdings. NPG is a member of OCLC, but RLIN is the better system for the Institution's growing needs. With its membership in RLIN, NPG will discontinue membership in OCLC.

By participating in the RLIN library automation system, NPG will maintain the Smithsonian Institution's status as a national art library through the collection and dissemination of its resources.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Several sources constitute the unrestricted general and special purpose funds, including the Gallery's share of sales in the restaurant and museum shop, allotments, sales of photographic reproductions of portraits in the collection, staff honoraria, and participation fees from museums to which the National Portrait Gallery loans exhibitions. These funds help defray the costs of public lectures, symposia, and special events in coordination with the opening of exhibitions, the associated costs of loan exhibition development and management, and the research expenses of staff preparing special publications or lectures. In addition, funds from the Smithsonian's Collections Acquisition, Scholarly Studies and Educational Outreach Programs, Research Opportunities Fund, and Special Exhibition Fund support research, education, and exhibition projects.

Restricted Funds - Designated for specific purposes, these funds are in the form of gifts and grants from individuals, foundations, organizations, and corporations.

In FY 1989, the Gallery received a generous grant from the Morris and Gwendolyn Cafritz Foundation to purchase a painting of Bishop George Berkeley. The Gallery purchased other acquisitions, notably a portrait of Thomas Seir Cummings by Augustus Earle, 73 photographs by Richard Avedon, a bronze bust of S. Dillon Ripley by Walker Hancock, and a portrait of Gertrude Stein and Alice B. Toklas by Sir Francis Rose, all from the contributions of Mrs. J. Paul Austin, the Barra Foundation, Inc., the T. M. Evans Foundation, Inc., Leslie H. Goldberg, Chester H. Lasell, and William Vareika.

The Kirkland & Ellis Foundation; Vinson & Elkins, Attorneys at Law; and Morgan, Lewis & Bockius, Counselors at Law, have lent their support to NPG's "Portraits of American Law" exhibition planned for the fall of 1989. Donaldson, Lufkin & Jenrette, Inc., and the Equitable Life Assurance Society of the United States have made generous contributions in support of the Gallery's ongoing exhibition programs. The Anschutz Foundation made a donation in support of "To Color America: Portraits by Winold Reiss" an exhibition scheduled for late October 1989. The Gallery has also received generous gifts from the New Sweden '88 New York Committee, the New York Community Trust, and the Ruth and Frank Stanton Fund. The Gallery has received a number of smaller gifts from individual donors.

The extent and degree of outside support in the coming fiscal years cannot be projected, but fundraising is actively under way for several major projects in FY 1991 and 1992.

HIRSHHORN MUSEUM AND SCULPTURE GARDEN

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	78	3,457	-	18	-	425	-	756	-	-
FY 1990 Estimate	78	3,556	-	20	-	485	-	1,598	-	-
FY 1991 Estimate	78	3,656	-	27	-	75	-	1,666	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Public Law 89-788, signed on November 7, 1966, established the Hirshhorn Museum and Sculpture Garden (HMSG) as the Smithsonian's modern and contemporary art museum. The collection is the basis of an active program of exhibitions. The Museum staff conducts extensive research; prepares catalogues, and offers a variety of educational activities.

For FY 1991, the Hirshhorn Museum and Sculpture Garden requests an increase of \$100,000 to provide expanded support for its Quincentenary exhibition "Four Latin-American Modernists: Torres-Garcia, Rivera, Lam, and Matta" (\$50,000), and to initiate an ongoing program to replace laboratory equipment (\$50,000).

PROGRAM - In keeping with its status as a museum of modern and contemporary art, HMSG conducts programs of research, exhibitions, collections management, acquisitions, deaccessions, and educational activities involving audiences of all ages. First opened to the public on October 4, 1974, the Museum attracts more than one million visitors a year, making it one of the most visited contemporary art museums in the United States.

Research - The Museum's resources include more than 13,000 works of art, a curatorial file providing information on artists and works in the collection, and a library with 35,000 books and catalogues. Students and researchers can view and study works of art not on display. The staff researches the provenance, exhibition history, iconographic significance, and physical condition of each work of art in the permanent collection. The staff also conducts extensive research in preparing exhibitions. A computer system gives access to collection information and recalls video images installed on the system.

Exhibitions - The Museum conducts an active exhibition program that draws upon works in its collection and other collections. Nearly 700 works from the permanent collection are on display at any one time. The Museum makes extensive loans to other museums.

In FY 1989, the Museum organized four major exhibitions: "Alberto Giacometti, 1901-1966"; "Recent Acquisitions 1986-1988"; "Robert Moskowitz: 1959-1989"; and "Francis Bacon." In the same fiscal year, the Museum displayed "Gerhard Richter: Paintings," an exhibition organized jointly by the Art Gallery of Ontario and the Museum of Contemporary Art, Chicago. After its initial showing at HMSG, the Giacometti exhibition traveled to the San Francisco Museum of Modern Art. The Moskowitz show will travel to the La Jolla Museum of Contemporary Art and the Museum of Modern Art, New York. The Bacon exhibition will travel to the Los Angeles County Museum of Art and the Museum of Modern Art, New York.

For the second year, the Smithsonian's Special Exhibition Fund partially supported two exhibition programs: "Directions" and "Works." The "Directions" series featured Austrian artist Walter Pichler, Chinese-American artist Mel Chin, and American artists Erica Beckman and Keith Sonnier. Each exhibition was accompanied by a small catalogue. The innovative "Works" program integrates the Museum's building and grounds into the creative process. HMSG commissions artists to visit the Museum and create temporary site-specific works. "Works" artists in FY 1989 included Krzysztof Wodiczko, Daniel Buren, Buster Simpson, and Houston Conwill. During the exhibition, HMSG provides a free handout detailing the artists' styles. Each year the Museum produces a catalogue of "Works" exhibitions which is sold in the museum shop.

During FY 1989, the Museum's staff also organized small exhibitions based on the permanent collection: "Numbers, Letters and Lines"; "Thomas Eakins Photographs: A Selection from the Permanent Collection"; and "Ralston Crawford Photographs."

In FY 1990, HMSG will show two major exhibitions: "Culture and Commentary: An Eighties Prospective" and "Bay Area Figurative Art, 1950-1965." "Culture and Commentary" surveys the art of the 1980s by highlighting 15 artists from Europe, Canada, and the United States whose expressive voices have fully developed in this decade. HMSG will ask a number of artists to create site-specific works for this exhibition. The San Francisco Museum of Modern Art is organizing the "Bay Area Figurative Art, 1950-1965" exhibition.

In FY 1991, major exhibitions scheduled include "John Baldessari," organized by the Los Angeles County Museum of Art; "Sigmar Polke," organized by the San Francisco Museum of Modern Art; and the American Visual Arts Exhibition, "-X."

Collections Management - HMSG inventories its entire collection on a three-year cycle, with spot checks made at least annually. Work continues on integrating the bequest of Mr. Hirshhorn into the permanent collection. The Museum develops object records, and the registrar and the conservation laboratory examine the objects. Staff photographers record the objects for both identification and reproduction purposes. The office of the registrar is transferring the permanent inventory from the old mainframe computer to the new mainframe. This office also is working to add video images to the inventory system.

Acquisitions - The function of HMSG, as described in the legislation, is to be "a museum in Washington, D.C. where modern art could be exhibited and studied...[to]...enrich the culture of the Nation." To reflect current developments in the visual arts, an active acquisitions program is essential.

In FY 1989, the Museum purchased the following: Eva Hesse's Vertiginous Detour (1966); Leon Kossoff's Between Kilburn and Willesden Green, Autumn (1987); Jean Tinguely's The Sorceress (1961); Louise Bourgeois's The Blind Leading the Blind

(c. 1947-1949); Manuel Neri's Untitled (1981); and, Anish Kapoor's At the Hub of Things (1987).

The Museum periodically reviews its collections to identify works of art that it judges to be duplicates or non-contemporary art. The Museum's Board of Trustees must approve all requests for deaccessioning. Before deaccessioning works of art to the public, at auction, HMSG offers these works for sale to bureaus of the Smithsonian Institution. According to the agreement with Mr. Hirshhorn, the Hirshhorn uses proceeds from any such sales to purchase new works of art.

Education and Public Orientation - To help visitors understand modern art HMSG creates a variety of educational materials. These include brochures and mini-catalogues distributed to the public free of charge. The education department trains docents to lead regular and special tours of the exhibitions. This department also programs the Orientation Room with both original creations and outside productions. HMSG's outreach programs assist visitors before they arrive at the Museum. In 1988, the Museum developed new outdoor signs to inform passersby of the current major exhibition.

The Museum sponsors three free film series: a lunchtime series about artists and their work; an evening series by artist film makers; and a Saturday series for young people. Other events held in the Museum's auditorium include concerts by the 20th Century Consort and lectures by artists, critics, and art historians. Occasionally, a symposium accompanies a related exhibition.

"Currents," a program of two free seminars, exposes high school juniors to the trends and ideas represented in new works of art. The students' comments and observations are printed in a free handout for the public.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Hirshhorn Museum and Sculpture Garden requests an increase of \$100,000 to provide expanded support for its Quincentenary exhibition "Four Latin-American Modernists: Torres-Garcia, Rivera, Lam, and Matta" (\$50,000), and to initiate an ongoing program to replace laboratory equipment (\$50,000).

Columbus Quincentenary Project (\$50,000) - The 500th anniversary of Christopher Columbus's voyages provides all Americans with an opportunity for expanded international cultural understanding. The increased public awareness and respect of other cultures promoted by this event will build a long-term foundation for encouraging international cooperation and scholarly exchange with Latin America.

The exhibition "Four Latin-American Modernists: Torres-Garcia, Rivera, Lam, and Matta" is HMSG's contribution to the Smithsonian Institution's celebration of the Columbus Quincentenary. It aims to broaden public understanding of the Latin American culture and, in particular, the impact of four Latin American artists on modern art. By focusing on Diego Rivera, Joaquin Torres-Garcia, Wifredo Lam, and Matta, the exhibition examines their aesthetic merits and distinctive styles that eventually moved beyond modernism.

The requested increase for FY 1991 will pay the costs of writing and editing an exhibition catalogue and a handout for the general public.

The Hirshhorn Museum's exhibition in conjunction with the Columbus Quincentenary will provide insight on Latin American culture and art.

Replacement of Laboratory Equipment (\$50,000) - HMSG's laboratories are equipped to maintain the Museum's collection of more than 13,000 works of art, photograph them, provide for their care, and use them in exhibitions and publications. Much of this equipment, purchased when the Museum opened 15 years ago, is now at the end of its useful life. To begin replacement of this equipment, HMSG requires a multi-year program.

New laboratory equipment will enable the staff to treat some works of art using modern technologies not available 15 years ago. It will also eliminate the health and safety hazards associated with the aging equipment. The replacement program will permit the Museum to maintain its high standards in the areas of conservation, photography, and exhibition installation.

The funds requested in FY 1991 will initiate HMSG's replacement program with the purchase of equipment for the conservation laboratory. In FY 1992 and following years, the Museum will purchase storage and laboratory equipment for the photo laboratory, the registrar's office, and the works on paper collection.

Replacement of aged laboratory equipment will enable HMSG to use more technically advanced equipment with improved safety features for the care of the Museum's collections.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds come from several sources including the Museum's share of sales in the museum shop, plaza cafe, and other miscellaneous receipts. An allotment meets the travel expenses of the Museum's Board of Trustees. The 20th Century Consort, which has performed at the Museum for more than ten years, receives partial funding.

Restricted Funds - The Hirshhorn Museum and Sculpture Garden has four endowment funds. The first fund comes from the \$1 million that Mr. Hirshhorn pledged at the signing of the initial agreement, and the second comes from the monies left to the Museum in his will. The third endowment comes from the sale of works of art. Finally, the Museum receives funds from the Holenia Trust, a Swiss foundation financed by Mr. Hirshhorn. The Museum can use these four funds only to purchase works of art. At the beginning of each year, the Museum's Board of Trustees has authorized 10 percent of the value of the endowment funds for use as a purchase fund for the current year.

Individuals, foundations, organizations, and corporations designate their gifts and grants for specific purposes. Generous grants from the Xerox Corporation and Credit Suisse provided partial support for the Giacometti exhibition. In addition, Balair supplied air transportation from Switzerland and the Pro Helvetia Foundation contributed funds for the brochure and a symposium.

ARTHUR M. SACKLER GALLERY/FREER GALLERY OF ART

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	68	4,300	1	91	-	-	23	2,610	-	-
FY 1990 Estimate	68	4,390	1	94	-	-	23	3,210	-	-
FY 1991 Estimate	75	5,314	1	96	-	-	23	3,035	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Freer Gallery of Art, established in 1906, and the Arthur M. Sackler Gallery, established in 1982, acquire, research, conserve, and exhibit Asian art. The Sackler Gallery, which opened to the public on September 28, 1987, lends and borrows objects and exhibitions. The Freer Gallery of Art uses and displays its collections as a basis for understanding the civilizations that produced them, but in accordance with the original bequest, only exhibits items from its permanent collection. The two museums complement each other whenever possible. Collections acquisitions for both museums are not duplicative but complementary, providing the fullest possible resources to draw upon for original research, exhibitions and preservation of the cultural heritage of Asia.

For FY 1991, the Arthur M. Sackler Gallery/Freer Gallery of Art requests an increase of 7 workyears and \$924,000 to provide curatorial services in sculpture and Japanese art at the Sackler (2 workyears and \$96,000) and to support the reopening of the Freer with exhibition specialists (3 workyears and \$102,000), collections technicians (2 workyears and \$52,000), furnishings and equipment for expanded conservation, research, and collections storage areas (\$276,000), and reinstallation of the Freer collections in the exhibition galleries (\$398,000). The Institution requests that the increase of \$398,000 for the reinstallation of the Freer exhibition galleries be available until expended.

ARTHUR M. SACKLER GALLERY

PROGRAM - The goal of the Arthur M. Sackler Gallery is to expand knowledge and appreciation of works of art from Asian countries, and of the human and physical contexts from which works of art emerge, through exhibitions, research, publications, and public programs. Toward this end, Dr. Arthur M. Sackler gave to the Nation a collection of almost 1,000 objects in the fields of Chinese, Indian, Southeast Asian, Near Eastern, and Japanese art. This collection now includes Chinese jades spanning a period from Neolithic times (5000-1500 B.C.) into the 19th century; Chinese bronzes from the Shang (ca. 1523-ca. 1028 B.C.) through the Han (206 B.C.-A.D. 220) dynasties; Chinese paintings; Chinese lacquer; Near Eastern ceramics and metalwork; sculpture

from Cambodia, India, and Thailand; and Japanese paintings, lacquer, ceramics, and prints.

Research - Research undertaken by both visiting scholars and the permanent curatorial and conservation staff provides the basis for exhibitions, publications, and collections acquisitions. In addition, the Sackler disseminates research results through a variety of public programs, including lectures by members, of the curatorial staff on subjects of current research. Additional guest lecturers focus on topics related to Asian art and culture.

Exhibitions, exhibition catalogues, and scholarly papers and articles result from specific research projects. The Gallery's publications program also includes a quarterly magazine, Asian Art, written for general understanding. Produced in cooperation with Oxford University Press, it features color plates and an informative text relating to various research activities, the permanent collection, recent acquisitions, and special exhibitions. Free leaflets and gallery guides are also published for the public.

Research in the area of conservation concentrates on the lead-isotope ratio analysis of Chinese bronzes in the Sackler and other collections and on the extension of identification methods into the field of organic colorants in paintings.

As a joint effort, the Freer and Sackler received a Scholarly Studies grant to study the ancient Near Eastern metalwork collections in both museums.

Exhibitions - Exhibitions are another major focus of the Sackler Gallery. During the past year, several inaugural exhibitions continued to display portions of the initial Sackler gift, together with other objects on loan from the estate of Dr. Arthur M. Sackler. The inaugural exhibitions that remained during FY 1989 were "Monsters, Myths, and Minerals," "Temple Sculptures of South and Southeast Asia," and "Chinese Buddhist and Daoist Imagery."

Besides the continuation of these popular inaugural exhibitions, several new exhibitions mostly organized by the Sackler staff opened to the public in FY 1989. They included "Recent Japanese Acquisitions," October 1988; "A Jeweler's Eye: Islamic Arts of the Book from the Vever Collection," November 1988; "Photographs of Afghanistan," April 1989; "Timur and the Princely Vision: Persian Art and Culture in the Fifteenth Century," April 1989; and "Yani: The Brush of Innocence," June 1989.

The Sackler will continue to originate and borrow exhibitions drawn from international public and private collections and from the Sackler Gallery collection. Many Sackler-organized exhibitions will travel to other museums and institutions. Future exhibitions include "The Noble Path: Buddhist Art from South Asia and Tibet," "India Along the Ganges: Photographs by Raghubir Singh," "Ancient Chinese Bronzes and Jades," "Yokohama Prints from the Leonhart Collection," "Indonesian Court Arts," "Masterpieces of the Che School Painting," "Paintings by Chang Dai-chien," "Selections from the Vever Collection," and "Mughal Gardens."

The Sackler plans additional exhibitions on Chinese mirrors, Ordos bronzes, Chinese lacquer, Chinese garment hooks, Indian paintings from private collections, Sasanian metalwork, Chinese furniture, Near Eastern ceramics, Far Eastern ceramics, and Chinese sculpture. When fundable and feasible, research catalogues will accompany the exhibitions.

Conservation - The Sackler Gallery must protect and conserve the art objects under its purview. This responsibility includes the objects in the permanent collections, in loan exhibitions held at the Sackler, and in Sackler-organized traveling exhibitions. The Sackler conservation effort includes object research to understand the origin of objects and thereby better develop the proper treatment of them. Expansion of the conservation facilities in the renovated Freer Building will also accommodate the requirements of the Sackler programs. The staff of the conservation laboratory have concentrated on particular items for future exhibitions, such as Buddhist and Tibetan sculpture. The staff also monitors environmental control of Sackler exhibition galleries and collections storage areas. The Freer Gallery of Art section of this narrative discusses the East Asian Painting Conservation Studio, which conserves Sackler collections as well.

Education - The Sackler Gallery attracts a large number of research scholars and has an active program of research fellowships and internships. Recipients work closely with curators on topics related to the collections. A grant from the Rockefeller Foundation established a Residency Program in the Humanities at the Smithsonian Institution. The Institution has awarded two to three postdoctoral appointments in Asian and African art each year since 1985. The Rockefeller Residency Program differs from existing fellowship programs in that it allows the fellows to become directly involved in the plans and programs of the museums and to participate in symposia, exhibitions, and publications. Similar scholarly grant programs will advance the research and education programs based on Asian art collections and exhibitions at the Sackler.

The Sackler Gallery is developing an active educational program for local school, college, and university students. Programs allow students at secondary, undergraduate, and graduate levels and visiting researchers to participate in symposia and seminars, at which they come into direct contact with major works of art and distinguished scholars and curators. Topics of such symposia and seminars relate to current exhibitions, the Sackler collections, or some aspect of Asian art and culture.

Education programs during FY 1989 included weekly storytelling for children and adults; children's guides to exhibitions; hands-on experience in the galleries with noncollection items similar to exhibited artwork; workshops for children, adults, and teachers; special tours for specific age groups; films; musical concerts; lectures both in English and an Asian language; and other Asian cultural events. Gallery guides for every exhibition provided information that supplements exhibition labels.

Educational outreach continued through a program for the elderly and the young. Docents gave illustrated slide lectures to community groups. Previsit education packets sent to schools prior to tours of the Sackler Gallery introduced specific areas of Asian art.

Collections Acquisition - The Sackler Gallery continues to acquire art objects for the permanent collection, that are of central interest to the museum, including the arts of Asia in its broadest terms, from Japan to the Near East. Objects acquired for the collection will be of high quality in terms of aesthetic standards, cultural history, and physical condition. The Sackler Gallery acquires objects by gift, bequest, or purchase, provided that the objects meet established acquisition criteria.

While the Sackler Gallery does not have a Federal base for collections acquisitions, the sale of merchandise at the Sackler museum shop provides modest Trust

funds for this purpose. In FY 1989, purchases with these Trust funds included four Chinese paintings by Kung Hsien (ca. 1617-89) and a Chinese painting by Wen Zhengming (1470-1559). Gifts to the collection in FY 1989 included an Indian hair ornament of gold and a photograph of Afghanistan. A Chinese painting dated 1890-1900 was given to the study collection.

FREER GALLERY OF ART:

PROGRAM - The Freer Gallery of Art houses one of the most distinguished collections of Asian art in the world. The collections consist of more than 27,000 works of art from China, Japan, Korea, India, and the Near East and spans 5,000 years. Included are paintings, sculpture, Biblical manuscripts, and other objects in stone, wood, lacquer, jade, pottery, porcelain, bronze, gold, and silver. The Peacock Room, by James McNeill Whistler is part of an outstanding collection of late 19th- to early 20th-century American art that Charles Lang Freer, the Gallery's founder, considered a bridge between the arts of the East and West. The Freer shares with the Sackler Gallery a library of approximately 45,000 volumes relating to the objects in the collections, open to the public for reference.

Although extensive renovations closed the Freer to the public in the fall of 1988, research, conservation, collections management, authentication services, and other such activities continue. During the renovation, collection items are available for study by appointment in the temporary collections storage areas. The Freer will reopen in 1992, after the completion of the tunnel to the Sackler Gallery.

The unique Asian collections in the Freer Gallery, together with notable holdings of American paintings, have made the museum an increasingly important center for students, scholars, and the public. With the Freer's reopening, museum tours, the Freer lecture series, and all other public programs will be available in an enhanced format as a result of the expanded and improved facilities the renovation makes possible.

Research - The Freer's primary area of focus is research. Freer Gallery research facilities--comprised of the collections, curatorial staff, library, and technical conservation laboratories--form the nucleus of its specialized efforts. Research findings are available to the public through exhibitions, catalogues of exhibitions, articles, object files, free gallery leaflets, and public lectures at the Freer and at other similar institutions. Updating the research files on individual pieces in the collection continues during the renovation, as well as automation of collections records. These files and the collections in storage are available to visiting scholars and students.

Although the results of curatorial research are most visible in the Freer's exhibitions, the Freer also disseminates research results to the public through collections research records, lectures, and published papers and books, activities that continue while the exhibition galleries are closed to the public for renovation. During the renovation period, the Freer also plans to publish a revised version of the catalogue, Chinese Figure Painting. Originally published in 1973 and out of print since 1978, it was the only study in its field. Revision of this text for publication required a comprehensive review of all literature written on the subject during the past 15 years, including scholarly developments based upon the original publication.

Exhibitions - During FY 1989, the Freer exhibition galleries were closed to the public. Preparations for the reopening exhibitions in 1992, which will feature the

finest pieces in the Asian and American collections continue. As part of the planning process, continuing research on Charles Lang Freer and the history of the Freer Gallery will provide significant information for the reopening exhibitions.

Conservation - In addition to its reputation for conserving and restoring objects, the technical laboratory of the Freer and Sackler galleries is a renowned research facility. For the past several years a primary concern of the laboratory staff was conserving and storing the Freer collections and preparing exhibits for the extensive reinstallation. During renovation, the environmental conditions in the temporary storage areas located in the Freer require continual monitoring by conservators.

Conservation research identified particular organic colorants in paintings and tested Chinese bronzes for lead content to help determine their provenance. Other Freer research examined unusual copper-green pigments on Ukiyo-e paintings, lead-white on Japanese paintings, discoloration of lead-white pigments on Persian paintings particularly in the Vever Collection, pigment samples taken from excavated objects (A.D. 5th-8th centuries) in Korean museums, microscopic paper fibers from very small samples, and metallurgy and properties of high-tin bronzes, including reconstructing the alloy and production methods used in making high-tin bronze mirrors from Aramula, India. In addition, an analytical project on Chinese Buddhist bronze sculpture (A.D. 3rd-16th centuries) studied the provenance and bronze manufacture methods and how they relate to the history of Chinese bronze metallurgy.

The East Asian Painting Conservation Studio takes a more traditional approach toward conservation of East Asian paintings and screens than do Western conservation laboratories. The Studio uses traditionally Japanese techniques, and the staff is considering using Chinese techniques on Chinese paintings. The Studio staff plans to train Americans in this specialized field to alleviate the critical shortage of skilled persons. Only three facilities in the United States currently restore and mount rare Far Eastern paintings and screens, and these facilities concentrate primarily on works for their respective museums.

Collections Acquisitions - In FY 1985, Congress established a Federal funding base for collections acquisition to the Freer Gallery. In FY 1989, purchases using Federal funds are currently pending approval. Purchases for the collections with FY 1989 Freer nonappropriated Trust funds included a Chinese painting from the Ming dynasty by Shen Chou. Eleven additional purchases with Trust funds are also pending approval before formal accession into the permanent collections. The staff is researching and classifying gifts to the Freer collections, including a Chinese ceramic bottle from the Ming dynasty, a Japanese dish from the Edo period, 25 Thai ceramics, 23 Vietnamese ceramics, and seven other Chinese ceramics.

Education - During FY 1989, the Freer Gallery carried out a wide range of research and scholarly activity that was available to the public through educational programs such as lectures. When the Freer reopens, educational materials available in the exhibition galleries will include a free introductory brochure for the visually impaired, free exhibition leaflets introducing various aspects of the Freer's collections, and docent-led tours. The education staff is developing these educational activities as well as new programs for the reopening.

Programs begun before the renovation will continue after the reopening. These include specific outreach programs that meet the needs of various groups such as the hearing and visually impaired. School and community groups studying specific aspects

of Asian art will be able to arrange tours of selected areas of the Freer. Docents will use customized slide sets when speaking to community groups. The education department will send special previsit education packets to schools before tours of the Freer Gallery.

Renovation Project - Major renovation of the Freer Gallery Building began in 1988 and continued in 1989. As a result, the Freer closed to the public in the fall of 1988 and will remain closed until the completion of the renovation and subsequent reinstallations of selections from the Freer collections in 1992. The renovation project includes:

- construction of an underground gallery connecting the Freer and the Sackler to create an additional 3,200 square feet of exhibition space and provide convenient access for visitors and staff who oversee and use both galleries' collections;
- excavation and replacement of the Freer courtyard to create new space below the courtyard;
- construction of a passenger elevator from a ground-level lobby on the south side of the building to improve gallery access for mobility-impaired visitors;
- expansion of space for conservation activities and technical study of Asian and Near Eastern art, from 1,750 to 5,765 square feet;
- expansion of collections storage space for the Freer by 11,500 square feet, or 70 percent, to accommodate collections that have nearly doubled since the Freer opened in 1923.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Arthur M. Sackler Gallery/Freer Gallery of Art requests an increase of 7 workyears and \$924,000 to provide curatorial services in sculpture and Japanese art at the Sackler (2 workyears and \$96,000) and to support the reopening of the Freer with exhibition specialists (3 workyears and \$102,000), collections technicians (2 workyears and \$52,000), furnishings and equipment for expanded conservation, research, and collections storage areas (\$276,000), and reinstallation of the Freer collections in the exhibition galleries (\$398,000).

ARTHUR M. SACKLER GALLERY:

Curator and Curatorial Assistant (2 workyears and \$96,000) - To balance the research staff in relationship to the Sackler collections, two additional positions in Japanese art and sculpture are required. The Sackler Gallery's mandate is to study and represent Asian arts.

Existing research positions for art curators reflect their training in specific geographic areas, such as China, Japan, and the Near East. These same curators provide coverage for various media in those geographic areas, including painting, ceramics, metalwork, jade, and lacquer. These curators are not trained, however, in the field of sculpture. Because the characteristics of sculpture are common among most Asian countries, the study of this medium is not bound by geographic area but focuses on the medium itself and on cross-cultural elements such as Buddhism. The

addition of a curator in this field will take advantage of the exceptional sculpture collection at the Freer and the foundation for one at the Sackler.

Currently, the Sackler has a full curator, an assistant or associate curator, and a curatorial assistant for each of the Chinese and Near Eastern collections. For Japanese art, however, the Sackler has only one assistant curator to oversee the nearly 4,000 objects in the Japanese art collection.

The requested increase will also enable the Sackler to hire a curatorial assistant for the Japanese art collections. The curatorial assistant will do research and perform curatorial tasks, including gathering background information for labels and catalogues, assisting with exhibition planning, and answering letters of inquiry. Senior staff will then be able to concentrate on substantive research projects, public service activities, exhibition planning, and selecting and negotiating the purchase of works for the collection.

These increases to the Sackler staff will help ensure the quality of research and exhibition planning and a successful acquisitions program appropriate to the distinguished world center of Asian art and culture.

FREER GALLERY OF ART:

Exhibition Specialists (3 workyears and \$102,000) - The addition of three exhibition specialists is required to reinstall Freer collections in the renovated exhibition galleries. The current staff, which has been producing exhibitions at the Sackler Gallery since its opening in 1987, is not large enough to prepare the reopening exhibitions as well as serve the expanded exhibition program currently planned for the Freer.

The positions requested include an exhibit lighting specialist, a woodcrafter-finisher, and an exhibition design detailer. A new focusable lighting system will be installed in 19 exhibition galleries and the exhibition corridors. The system includes more than one-half mile of lighting track and 1,200 separate lighting fixtures in addition to the major fixtures at the grand hall entrance and at the Independence Avenue entrance to the Freer. The exhibit lighting specialist will be responsible for the system's lighting, relamping, maintenance, and inventory.

The woodcrafter-finisher will be responsible for the overall finishes and the specialty woodwork that has long been associated with the Freer Gallery. Permanent natural wood cases require considerable maintenance and repair, especially as the viewing public increases in number. In addition, the woodcrafter will construct and install special woodworking, such as sculpture bases, specialized cases, and custom frames.

The exhibition design detailer will provide the hardline designs from architectural design sketches and add the details in working drawings that reflect the coordination of the electrical, fire safety, mechanical, and carpentry work.

The three specialists will provide the Freer with the capacity to maintain the Gallery's high standards of exhibition presentation after the renovation is completed, thereby at the same time enhancing the educational and aesthetic experience of gallery visitors.

Collections Technicians (2 workyears and \$52,000) - As part of the program to reestablish Freer museum programs after completion of the renovation and to expand the Gallery's collections management function in support of more active exhibition program and a larger collections storage space serving more visiting scholars, students, and the general public, the Freer requires two collections technicians.

Two of the three technicians previously assigned to Freer collections now work with the Sackler permanent collections and loan exhibitions while the Freer is closed. The four technicians at the Sackler manage loan activities, including all object handling in the collections. The FY 1991 request for the addition of two technicians will restore the Freer staff to three. These technicians will prepare for the Freer reopening and reorganize the Freer collections as they are moved into their new storage facilities. They will also serve the general object handling needs associated with collections management.

The addition of two collections technicians will strengthen the physical care and management of the Freer collections both on exhibit and in storage, ultimately promoting greater public understanding of Far and Near Eastern cultures and their arts.

Furnishings and Equipment for Expanded Conservation, Research, and Collections Storage (\$276,000) - Federally supported Freer renovations include the expansion of conservation, research, and collections storage areas. These new spaces for staff and researchers will need furnishings and equipment that will ultimately strengthen conservation, research, and collections management functions at the Freer.

The technical laboratory requires office furniture, computer equipment, and specialized equipment, including microscopes and photographic and chemical analysis equipment. Although the exhibition galleries will reopen to the public in 1992, the expanded laboratory must be equipped by 1991 to prepare objects for display at the time of the reopening. Purchases for the collections storage areas include study tables with cork tops to provide a cushioned surface for the objects, tables of extra length to view East Asian paintings on hand scrolls, special object-viewing tables, desks, and computers for access to data on the collections. The research areas need office furniture and computers for the same functions.

These requests for furnishings and equipment support activities that promote greater public understanding of Far and Near Eastern cultures and their arts.

Reinstallation of the Freer Collections in the Exhibition Galleries (\$398,000)- The appearance of the Freer's exhibition galleries at the time of the reopening in 1992 is crucial to sustaining the favorable public memory of the Freer before the renovation and to generating positive expectations of the future. The reinstallation of the Freer collections in the galleries must achieve the high standard of excellence in quality and content that has distinguished the Freer during its almost 70 years of public service.

Funds are needed for architectural millwork, the refurbishing of existing exhibition cases (most now more than 60 years old), props and seating, as well as for the construction of new cases and display devices, such as bases and pedestals; for the preparation and silk-screening of exhibition graphics, including case and wall labels; for carpeting in exhibition areas; for refurbishing the original grand hall light fixture; for graphic illustrations and maps; and for materials and supplies to support the installation of 20 galleries and exhibition corridors, totaling more than

25,000 square feet. Of particular concern in the reinstallation plans is increased security against vandalism, a disturbing development in the last year before closing the Freer. While security as a goal is unanimously accepted, there are a variety of solutions, with different aesthetic implications, that will be defined partly by the objects in question and partly by the financial resources available. A major consideration for the Freer is altering some traditional exhibition elements to improve accommodations for visitors with various physical and mental impairments.

Careful planning is essential for exhibit renovation, often requiring scheduling several years in advance for demolition, object selection and preparation, and installation. Because of current restrictions on specific funding, monies come from a variety of sources to pay for exhibit reinstallation. This further delays production. Because of the magnitude of the costs involved in exhibit revitalization and the requirement of multi-year planning, the Museum requests that this funding (\$398,000) for reinstallation of the Freer exhibition galleries remain available until expended. This is unlike the remainder of the salaries and expenses appropriation for this line-item which is a one-year appropriation. The "Highlights" section of this budget contains a further justification for no-year funding.

The Freer Gallery of Art is the original national museum of Asian art and was the first art museum in the Smithsonian Institution. Its reopening after four years is a very significant event, and support for this project must reflect that significance. A portion of the Freer renovations is a historic restoration, appropriate for a landmark building, and the reinstallation of the public galleries must complement the quality of the restoration. .

Exhibitions in the new Sackler Gallery have quickly achieved a reputation for high standards of craftsmanship and imagination, enabling visitors to understand and appreciate the art on display. Financial resources must be sufficient for achievement of the same quality at the Freer. With these resources, the Freer will also maintain the national and international reputation in outstanding research and exhibition it has established over more than six decades.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Annual allotments to the Arthur M. Sackler Gallery and the Freer Gallery of Art provide funds to defray the costs of special events associated with the opening of new exhibitions and to cover the travel costs for members of the Sackler's visiting committee. These funds also support the position of coordinator for special programs for the Freer and Sackler galleries. The proceeds from sales in the Sackler museum shop support the purchase of acquisitions, the publication of exhibition catalogues and gallery guides, and the operation of the shop.

Restricted Funds - These funds are contributions in the form of grants and gifts from individuals, foundations, organizations, or corporations for specific purposes.

The major portion of the nonappropriated Trust funds for the Freer comes from the Charles Lang Freer bequest, which restricts their use. The funds help finance the Freer's professional curatorial staff, administrative staff, acquisitions for the collection and library, the maintenance of the Freer's courtyard, and the operation of the Freer museum shop. Funds from the Harold Stern Memorial Endowment support scholarly research in the field of Japanese art. Funds from the Forbes Endowment support research in conservation.

ARCHIVES OF AMERICAN ART

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	20	1,101	-	98	-	-	12	823	-	-
FY 1990 Estimate	20	1,141	-	98	-	-	12	1,758	-	-
FY 1991 Estimate	24	1,186	-	98	-	-	12	1,707	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Archives of American Art (AAA), a national research bureau with regional centers in New York, Boston, Detroit, San Francisco, and Los Angeles, is the Nation's largest repository of archival source materials relating to the history of the visual arts in the United States. It holds more than nine million documents, 400,000 photographs, 75,000 works of art on paper, and approximately 3,000 tape-recorded oral and video interviews. The Smithsonian Institution houses original materials in Washington, D.C., with microfilm copies of many available in regional centers and through interlibrary loan across the country. Besides its primary mission of providing research materials for academic scholars, students, curators, collectors, and others studying the history of art, the Archives actively collects and preserves original source materials pertinent to such study. It also sponsors symposia, lectures, and other public programs to encourage research; conducts active membership and education programs; and publishes a quarterly journal.

For FY 1991, the Archives of American Art requests an increase of 1 workyear and \$45,000 to provide a supervisory archivist and support for its most active collecting center in New York. An additional 3 workyears are needed to use funds previously provided for ongoing inventory of the permanent collections at the Washington, D.C., processing and storage center.

PROGRAM - Founded in 1954 as a private institution in Detroit, the Archives of American Art became a bureau of the Smithsonian Institution in 1970. The Archives promotes the study of American art and cultural history by assembling and preserving an ever-expanding collection of letters, diaries, sketchbooks, business records, photographs, drawings, prints, oral histories, and video interviews. In making these primary historical records available to researchers and the public, the Archives advances the scholarly study and interpretation of the arts in America.

Research - In FY 1989, some 3,700 faculty members, graduate students, museum curators, Smithsonian Fellows, and free-lance writers used the Archives collections for research, often for extended periods. Eight hundred other scholars across the country borrowed 2,400 rolls of microfilmed collections through interlibrary loans. Staff members presented the results of their own research in several books, articles,

and formal papers. Acknowledgments and citations to the Archives and its holdings appeared in more than 200 books, exhibition catalogues, articles, and dissertations published or completed during the year.

Collections Development - Most of the collections acquired by the Archives in 1989 cover the early to mid-20th century. Helen Torr and Arthur Dove's diaries and other papers trace the activities of one of the best-known early American modernist painters, and an important group of Andrew Dasburg's correspondence includes letters from Louise Bryant, Mabel Dodge, Marsden Hartley, D. H. Lawrence, John Marin, and Georgia O'Keeffe. The Archives supplemented its extensive documentation of the 1913 Armory Show when it borrowed the financial records of the event from the Hirshhorn Museum and Sculpture Garden. The treasurer of the artists' society that organized the 1913 exhibition, Elmer MacRae, compiled the original reports, and the Archives will retain microfilm copies of these valuable records.

The Depression and immediate postwar period comprise two major fields of Archives strength. Several new acquisitions have enhanced scholarship in these areas. These acquisitions include: Stuart Davis's material on the Artists' Union magazine Art Front; additions to the already voluminous papers of Marcel Breuer and Joseph Cornell; and Charles Pollock's correspondence, which includes several letters from and many references to his more famous brother Jackson. The records of Christopher Willmarth and an installment of the records of Dimitri Hadzi augment the Archives' materials on contemporary American sculpture.

Papers of artists in other media include those of the photographer Nickolas Muray and the potter Maija Grotell. The Norlyst Gallery files, the extensive records of the prominent art historian and museum director John I. H. Baur, and the papers of the folk art collector Herbert Hemphill cover more art world activities.

The Archives' oral history program, always a fruitful activity, produced taped interviews with artists from an older generation such as Milton Resnick and Herman Cherry and with younger artists such as Lois Dodd, Otto Piene, and Joel Shapiro. An independent scholar, Ruth Bowman, donated a substantial collection of interviews which she conducted in the 1960s. These interviews recorded the observations of a wide range of notable artists, collectors, and museum directors, including the then-Secretary of the Smithsonian Institution, S. Dillon Ripley.

Exhibitions - A small but effective exhibition space in the new Archives' quarters in New York opened at the beginning of FY 1989, with Archives documents commemorating the 75th anniversary of the 1913 Armory Show. The New York Regional Center now displays a selection of letters, photographs, sketches, cartoons, and printed items from various Archives' collections. Following long practice, the Archives also lent documentary material to museum art exhibitions throughout the country, including exhibitions at the Corcoran Gallery, the Art Institute of Chicago, the Pennsylvania Academy of the Fine Arts, the Graduate Theological Union in Berkeley, California, and the Danforth Museum in Framingham, Massachusetts. The American Art/Portrait Gallery Library opened its cases to a display of drawings, sketchbooks, and correspondence from the Oscar Bluemner papers.

Public Education - The quarterly Archives of American Art Journal is the chief means of disseminating information on the Archives' collections. The journal regularly publishes significant documents and oral histories, articles, reviews by art historians who use the Archives, and regional office reports on recent acquisitions. In FY 1989, the Smithsonian Institution Press published Reliable Sources, an

illustrated book of artists' letters, sketches, and photographs drawn from the Archives' collections. Other works prepared by the staff and published during the year are a guide to art-related manuscript holdings in Philadelphia, a guide to Archives of American Art sources on African-American artists, a biographical dictionary of 20th-century Michigan artists, and a monograph on the African-American sculptor James W. Washington, Jr. The Archives' Washington office continued its monthly series of informal seminars on current research projects in art history and American studies.

Conservation and Care of Collections - The Philadelphia-based Conservation Center of Art and Historic Artifacts undertakes the conservation of fragile and deteriorating items for the Archives. Individual pieces treated for preservation in FY 1989 include 19th-century drawings, a lithograph, a volume of sketches by various artists, six photographs, three numbers of Alfred Stieglitz's scarce publication Camera Work, and 28 letters. The Archives' three-year campaign to transfer its card catalogue and other finding aids to a Smithsonian-wide computerized data base made substantial progress in FY 1989 with the entry of detailed descriptive information on nearly one-third of the 5,000 separate record groups.

With funding provided in FY 1989, the Archives will hire an archives specialist to organize and manage its registrarial and cataloguing functions. The specialist will provide control of the collections, maintain acceptable standards for recording movement and use of the collections, and manage the necessary record keeping. The specialist will also be responsible for developing and maintaining the Archives' automatic system to provide control over movement of all collections. These responsibilities will include formulating policies and procedures necessary to implement this integrated automation system and training staff members in the use of the system. When the system is fully operational, Archives' managers will have an accurate and complete picture of the current status of all archival functions. By fulfilling these functions, the specialist will enable the Archives to respond more effectively and quickly to research needs and to assure that control of collections meets professional and Institution standards. AAA expects to fill this position by the end of FY 1989.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Archives of American Art requests an increase of 1 workyear and \$45,000 for a supervisory archivist and support costs in its New York Regional Center and 3 workyears (no additional funding needed) for technicians to inventory collections in the Washington, D.C., processing and storage center.

Archivist and Support (New York) (1 workyear and \$45,000) - A supervisory archivist will make the materials acquired by the New York Regional Center available to researchers in a more timely manner. Because this archivist will improve the processing of backlogged and newly accessioned materials, the Archives will conserve and access more effectively these unique and valuable primary sources. Further, the position will prevent future backlogs, with the concurrent problems of preservation and dissemination.

The New York Regional Center receives more than half of the approximately 500 cubic feet of papers the Archives acquires annually. Moreover, because New York City continues to be the core of the American art world, the papers acquired there are also among the most significant coming into the collections. Yet the New York Center has never had professional archival staff. As a consequence, unprocessed materials have accumulated, including the papers of Henry Russell Hitchcock, Arthur Dove, Christopher

Willmarth, John I. H. Baur, and Marcel Breuer. Until the Archives processes these materials to determine the content, catalogues them, and identifies papers needing immediate conservation, scholars cannot use the collections for research. A professional, supervisory archivist will oversee processing the backlog and train the two part-time technicians to work more effectively with the volume of incoming and backlogged documentary material. This professional will organize, direct, target, and plan systems for handling the materials so they get quickly processed, catalogued, and prepared for microfilming and therefore be ready for researchers to use. These functions are essential to the responsible management of the Archives' collections.

AAA requests the funds to hire a supervisory archivist and to purchase supporting materials and supplies, as well as to underwrite telecommunications and transportation costs. The supplies include acid-free folders, acetate sleeves, and archival boxes for protecting and processing collections materials. In addition, the funds will support automation costs related to accessioning and cataloguing.

Valuable and unique historical materials are inaccessible and deteriorating in the New York Regional Center. These materials need the professional attention that only a trained archivist can provide. With such help, the Archives will be able to eliminate the backlog and keep up with the processing of newly acquired collections so that scholars, students, and museum staff across the country can use these primary source materials to pursue their research and further their understanding of America's art history.

Inventory Technicians (Washington, D.C.) (3 workyears) - Inventory technicians will provide better physical control of the Archives' collections and will make it possible for the Archives to respond more quickly to research inquiries from around the world. The technicians will also facilitate the administration and conservation of these valuable collections. Further, by hiring graduate students in the library and archival sciences for the positions, the Archives will provide a unique opportunity for these students to gain professional, hands-on experience with important historical source materials.

With three inventory technicians, AAA will implement procedures for verifying, preserving, and improving access to its collections. These technicians, on an on-going cyclical schedule, will:

- verify and maintain records on the location and movement of collections for research, conservation, and exhibition;
- compile and enter data about the collections into the Archives' on-line data base;
- rehouse fragile portions of collections into archival containers;
- prepare original papers for microfilming and retiring from active use to assure their preservation.

These activities support the administration of the Archives' collections and are important to reliable control of the collections. Permanent inventory technicians are necessary for the Archives to monitor and care for its collections properly.

The 3 requested workyears will allow for three permanent inventory technicians. The Archives received a transfer of \$73,000 from the Institution's Collection

Management/Inventory Program in FY 1988, which the Archives will continue to use in FY 1991 and beyond to pay for these positions. To fill these positions, the Archives will recruit graduate students enrolled in library and archival science programs at local universities.

It is essential for the physical control and responsible management of the collections that the Archives develop a staff dedicated to inventory work in the collections. The three inventory technicians will be that critical staff, and through their work, will facilitate conservation efforts and research, playing a fundamental role in expanding scholarship in the history of American art.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Provided through annual allotments, these funds defray costs associated with special events, supplement travel expenses incurred by the Archives' Board of Trustees, and provide partial support for general operating costs.

Restricted Funds - Fund-raising activities, gifts, foundation and corporation grants, the Board of Trustees, and a membership program generate funds for the Archives. A substantial portion of this income supports the Archives' general operating expenses, its oral history program, and its publications program.

Foundation and corporate grants provide the principal source of support for special projects. The Pew Charitable Trusts funded the Archives' Philadelphia Documentation Project for the final two years. Major grants from the J. Paul Getty Trust and the Andrew W. Mellon Foundation underwrite the costs of the Archives' retrospective cataloguing and automation project, and the Ahmanson and Times Mirror Foundations contribute to the support of the Southern California Research Center. The Henry Luce Foundation, Inc., provided funding for a three-year national collecting effort enabling the Archives to do further collecting work throughout the South, to begin an Asian-American documentation project on the West Coast, and to publish guides to art-related sources for study in Philadelphia and Chicago. Funds from the Brown Foundation, Inc., have made possible the processing of the Walter Pach papers along with a fall 1989 exhibition in New York of selected documents and publication of a guide to the collection. Brown Foundation funds also underwrite the costs of general operations, as does income from the Wellin-Taubman Reserve Fund established in 1986 by the Archives' Board of Trustees.

COOPER-HEWITT MUSEUM

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	32	1,245	18	897	7	1,155	1	853	-	50
FY 1990 Estimate	32	1,297	18	933	7	1,095	1	934	-	-
FY 1991 Estimate	44	2,021	18	940	7	1,116	1	252	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Cooper-Hewitt Museum, the Smithsonian Institution's National Museum of Design, located in New York City, explores both the processes and the products of design. It examines the influence objects have on daily life--how they shape and are shaped by culture. The design concerns of the Museum are virtually unlimited, encompassing fields as various as urban planning, architecture, industrial design, landscape design, interior design, textiles, fashion, theater arts, advertising, graphic arts, and crafts. The National Museum of Design seeks to encourage "good design" as well as to foster an improved understanding of the design process, to raise the level of discussion in related fields, and to improve the dialogue between audience and designer. It pursues this goal through diverse programs, which include provisions for making the collections available for study, research, and display; educational programs for professionals, graduate students, and the general public; general exhibitions; publications; and conferences keyed to significant design issues.

For FY 1991, the Cooper-Hewitt Museum requests an increase of 12 workyears and \$724,000 for an assistant curator of wallcoverings (1 workyear and \$36,000); the establishment of an education department (3 workyears and \$310,000); an assistant curator and secretary for decorative arts (2 workyears and \$59,000); buildings and grounds operational support (1 workyear and \$124,000); and operational support for the newly acquired Fox House facility (5 workyears and \$195,000).

PROGRAM - The Cooper-Hewitt Museum was originally established as the Museum of the Arts of Decoration of the Cooper Union in 1897 by the Hewitt sisters, granddaughters of Peter Cooper, founder of the Cooper Union for the Advancement of Science and Art. They saw it as a working laboratory--freely available to as broad a public as possible. The collections were acquired by the Smithsonian in their entirety in 1968. In 1972, the Carnegie Corporation donated the historic 1902 mansion, built as the private residence of Andrew Carnegie, and the McAlpin-Miller House, a small neighboring townhouse, to the Smithsonian as the permanent home for the Museum and its collections. The Museum reopened to the public as the Cooper-Hewitt National Museum of Design in October 1976. Today, students, professionals, and the

general public use the Museum's collections as guides, inspirations, and references for their own creativity.

Collections - The Museum cares for approximately 170,000 permanent collection items including drawings, prints, wallcoverings, textiles, ceramics, glass, metalwork, jewelry, and related decorative arts from Europe, America, and Asia, spanning 3,000 years. The Museum's specialized library of 50,000 volumes includes more than 5,000 rare books, 3,000 trade catalogues, and subscriptions to 300 periodicals. In the first three quarters of FY 1989, the Museum's library served more than 650 outside users, and circulated nearly 2,000 volumes. The Cooper-Hewitt also has important industrial design archives, including materials from Henry Dreyfuss, Donald Deskey, Ladislav Sutnar, George Kubler, Therese Bonney, and Gilbert Rohde. Many consider the Museum's holdings among the finest of their kind in the world.

Exhibitions - The Museum presents 10-12 new exhibitions annually, many of which are originated by Cooper-Hewitt staff and consulting curators. These events draw many visitors to the Museum. In the first three-quarters of FY 1989, attendance totaled 105,970.

In October 1988, the Museum presented two international exhibitions: "The Modern Dutch Poster: The First 50 Years, 1890-1940," organized by Krannert Art Museum, University of Illinois at Urbana-Champaign, and "Erich Mendelsohn: Architectural Drawings," organized and drawn from the collections of the Kunstbibliothek SMPK in Berlin. Opening in November 1988, in celebration of the 300th anniversary of the accession of William and Mary to the throne of England, was "Courts and Colonies: The William and Mary Style in Holland, England, and America," which included more than 250 works of art, architectural prints, drawings, furniture, ceramics, and silver from the late 17th and early 18th centuries. Under the gracious patronage of Her Royal Highness Princess Margriet of the Netherlands, the exhibition was co-organized by Cooper-Hewitt and the Carnegie Museum of Art in Pittsburgh. The international curatorial team consisted of colleagues from the Rijksmuseum in Amsterdam, the Victoria and Albert Museum in London, and staff from the Cooper-Hewitt Museum.

Many exhibitions are drawn from the Cooper-Hewitt's permanent collections. In December 1988, the Textile Department organized "Purses, Pockets, Pouches," a survey of textile techniques and materials involved in making purses, pockets, pouches, and portfolios, which included examples of small bags dating from the 17th to the 20th centuries. In January 1989, the Drawings and Prints Department, from its holdings of more than 7,000 American drawings, exhibited 75 drawings, watercolors, and oil sketches spanning the period from the 1830s to the 1930s and including works by such artists as Winslow Homer, Frederic Edwin Church, Thomas Hart Benton, Elihu Vedder, Thomas Moran, William Trost Richards, and William Merritt Chase. "American Drawings from the Cooper-Hewitt Museum: Training the Hand and Eye" will travel under the auspices of the Smithsonian Institution Traveling Exhibition Service (SITES) through October 1990.

The Museum also played a particularly significant and highly visible role in the international celebrations of the Bicentennial of the French Revolution with its presentation of another landmark exhibition, "L'Art de Vivre: Decorative Arts and Design in France, 1789-1989," which opened March 30, 1989. This exhibition, which filled the entire Museum, brought together more than 600 works from public, private, and corporate collections in France and the United States and attracted approximately 70,000 visitors. Some of the most notable visitors to the show included Mme. Mitterrand and Mayor Jacques Chirac of Paris.

"Polished Perfection: The Art of Turned-Wood Bowls," organized by SITES, opened on July 25, 1989. It includes 84 works by 21 North American master turners and four early American settlers, which come from the private collection of Edward Jacobson. "Views of Rome: Drawings and Watercolors from the Vatican Library," also organized by SITES, opened at the Museum on August 8, 1989. With 81 drawings ranging from the 16th-19th centuries, it focuses on the physical changes of the ancient monuments of Rome and the Campagna over the years, as well as changing artistic viewpoints. Also in August, the Decorative Arts Department presented an exhibition of 19th-century jewelry from the Museum's permanent collection which includes Renaissance Revival designs from Giuliano Castellani.

Future exhibition and publication plans include "The Intimate World of Alexander Calder," comprised of personal works by the sculptor for family and friends, such as miniature mobiles and stables, household utensils, toys, jewelry, wire sculpture, drawings, and countless other items. Organized by the Musee des Arts Decoratifs in Paris, the exhibition is accompanied by a book of the same title. Opening in November 1989 is an exhibition developed from the Drawings and Prints Department holdings of the work of E. McKnight Kauffer, the 20th-century graphic designer-illustrator particularly noted for his posters featuring British Rail and American Airlines and for his costume and stage designs. In the spring of 1990, the Cooper-Hewitt will present another project involving the collections. "Color, Surface, Light" will focus on textiles of the last decade, particularly innovative works involving surface effects and color, new fibers, dye techniques, and the effects of light on textile surfaces. For presentation in the Museum's garden in the summer of 1990, the Museum plans a "hands-on" exhibition of architect-designed doghouses that addresses design issues for the blind. The project is organized in cooperation with Guiding Eyes for the Blind, Inc. In September 1990, the Cooper-Hewitt will present "Cooper Union Legacy" (working title), a major exhibition exploring the history and development of the Museum and its collections. For the first time, the permanent collections will occupy one-half the gallery space. Also in September, the Museum will present "Drawings by Francesco and Giovanni Carlo Bibiena," an exhibition of work by the renowned 18th-century stage and theater designers, which is organized by the Museo Nacional de Arte Antigua in Lisbon and circulated by Art Services International.

For October 1990, the Cooper-Hewitt is planning a project on the theme of "Refinement and Reform in Design for the American Home, 1830-1980," as illustrated in the Museum's collections. This project is part of a complex series of exhibitions and programs focusing on the theme "Home: A Place in the World," organized in cooperation with five other New York City museums and the New School for Social Research. The Museum is continuing its plans for the creation of an exhibition and publication on "Czech Architecture and Design, 1900-1950," scheduled for 1992. The project is a joint undertaking with the National Museum of Technology in Prague, the National Museum of Decorative Arts, Prague, the Canadian Centre for Architecture, Montreal, and, possibly, a second American venue. Also in 1992, as its contribution to the Columbus Quincentenary celebrations, the Cooper-Hewitt will present an exhibition on maps and the age of exploration.

Publications - The Cooper-Hewitt publishes exclusively with private funds. In November 1988, the Museum produced Courts and Colonies: The William and Mary Style in Holland, England, and America, a 252-page catalogue that has received critical acclaim. A thematic publication containing nine essays, L'Art de Vivre: Decorative Arts and Design in France, 1789-1989, accompanied the exhibition of the same name. The Museum is in the process of editing both Housing: Symbol, Sites, Structure, a project of the director emeritus and The Catalan Spirit: Gaudi and His

Contemporaries, inspired by the Museum's FY 1987 exhibition. Also, the Cooper-Hewitt received a Federal Design Achievement Award for its 1985 publication Wine: Celebration and Ceremony.

Education - In addition to those visitors who enjoy Cooper-Hewitt exhibitions and publications, the Museum serves a large and diverse group who enroll for lectures, courses, symposia, workshops, and tours organized throughout the year by the Programs Department. These audiences, some of whom receive undergraduate college credit from Parsons/New School for course work completed at the Museum, annually average 5,000-6,000. During FY 1989, programs included:

- Enid and Lester Morse Lecture Series: "The Palatial Setting: The Architectural Legacy of the Reign of William and Mary" and a major symposium on decorative arts of the period, entitled "The Glorious Revolution in the Decorative Arts during the Reign of William and Mary," which was made possible through the generous support of Mr. and Mrs. Lester Morse;
- Lillian Brizel Sapirstein Lecture: "19th-Century French Jewelry: Empire to Art Nouveau" and a seminar, sponsored by the Comite Colbert and HG, entitled "A Taste for History: Fashion and Furnishings in 19th-Century France," both offered in conjunction with "L'Art de Vivre";
- "1939 World's Fair Programs: The Larry Zim Memorial Lecture on the 50th Anniversary of the 1939 World's Fair," held in commemoration of the Larry Zim bequest of 1939 World's Fair materials to the Smithsonian Institution and the Cooper-Hewitt Museum, and a special showing of vintage film footage on the Fair compiled from historic documentary films and rare home movies;
- programs related to themes in the Museum's collections, including a symposium on magazine design, a colloquium on American ceramics, a lecture on the architecture of Erich Mendelsohn, and a series on French and Italian garden history; and
- a lecture series on African textiles in celebration of Black History Month.

The Programs Department also organized an architectural study tour to Central Europe and is planning a similarly focussed tour of the Soviet Union.

The Cooper-Hewitt/Parsons School of Design Graduate Studies Program in the History of European Decorative Arts has had six graduating classes since its inception in 1982. The Graduate Program is the first academic degree-granting program ever offered by the Smithsonian Institution. Each year, 15-20 students enroll for a two-year period of classwork, field trips, and independent study in various areas of the history of design and decorative arts. Accredited by the New York State Board of Regents, the Program awards a master of arts degree upon completion of course work and research requirements. Graduates have assumed a wide range of professional, curatorial, and educational positions.

Special Events - Much of the Cooper-Hewitt's year-round activity depends substantially upon the support received from approximately 5,500 members, individual or foundation benefactors, and corporate sponsors and patrons. The Museum hosted several special events during FY 1989 at which major corporate patrons celebrated the Cooper-Hewitt's work and their own interest in the design arts. Firms include Air France, Henri Bendel, the Hearst Corporation, Smithsonian magazine, AMEV Holdings,

Krug, Christofle, and the hotel members of the Comite Colbert. Hermes held a special benefit reception for the Museum's Junior Committee. At the opening reception and ceremonies for "Courts and Colonies," one of the largest events of FY 1989, the Museum was honored by the presence of Her Royal Highness Princess Margriet of the Netherlands, her husband Mr. Pieter Van Vollenhoven, and their son Prince Bernard, as well as the Netherlands ambassador to the United States, Richard Fein and Mrs. Fein; the Netherlands Ambassador to the United Nations, Adriaan Jacobovits de Szeged and Mrs. Jacobovits de Szeged, Consul General Adrien F. Tieleman and Mrs. Tieleman, and British Counsul General Sir James and Mrs. Mellon. Nearly 2,000 guests attended the gala opening of "L'Art de Vivre," including Mayor Edward I. Koch of New York City; the Ambassador of France, Emmanuel de Margerie and Mrs. Margerie; Consul General Benoit D'Aboville; designer Philippe Starck, and actress Catherine Deneuve. Of special note was the Garde Republicane, sent to New York by President Francois Mitterrand in celebration of the opening of the American festivities for the Bicentennial of the French Revolution.

Nearly 2,000 members enjoyed the Museum's annual June Garden Party. In a separate event, mayor Koch delivered the opening remarks for the Museum's single-evening celebration of New York City's 11th annual Museum Mile Festival, at which more than 5,000 New Yorkers toured the Museum. A series of six free musical concerts sustained the festive mood throughout the summer season.

Collections Management - Among the Smithsonian's art museums, the Cooper-Hewitt has a tradition of being one of the most active collectors, borrowers, and lenders. In the first three-quarters of FY 1989, the Museum acquired more than 2,253 items (350 by purchase, 1,901 by gift, and 2 bequests), lent 126 to 19 other museums, and borrowed 1,306 from 175 lenders.

Efforts to refine the collection remain an important part of modern collections management activity at the Cooper-Hewitt. During FY 1989, the Museum continued deaccessioning substantial groups of textiles, old master prints donated expressly for eventual sale, and paintings inappropriate to the scope of the collection.

Acquisitions - The most significant purchase of FY 1989 was the Henry and Ludmilla Shapiro Collection of Soviet porcelains. This collection, unique in the United States, comprises more than 250 examples of tablewares and figural porcelains made from the time of the Russian Revolution to the present day. The porcelains are an exceptionally complete survey of propagandistic ceramics made and promoted in the Soviet Union. This collection was acquired with assistance from the Collections Acquisition Program matched by funds raised by the Decorative Arts Association of the Cooper-Hewitt Museum and a special donation, in the form of a generous discount from the collection's appraised value, from the Shapiros. The Museum also received a gift of the remaining materials in the Donald Deskey Archive, from the designer. A portion of the materials were donated to the Museum in 1975 while the rest were in the Museum's care on loan. The entire Archive contains nearly 2,400 drawings and blueprints and more than 25 linear feet of documentary artifacts from every aspect of Deskey's career. An exhibition surveying his career, built around materials in the Archive, is in the planning stage.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Cooper-Hewitt Museum requests an increase of 12 workyears and \$724,000 for an assistant curator of wallcoverings (1 workyear and \$36,000); the establishment of an education department (3 workyears and \$310,000); an assistant curator and secretary for decorative arts (2 workyears and \$59,000); buildings and grounds operational support (1 workyear and \$124,000); and

operational support for the newly acquired Fox House facility (5 workyears and \$195,000).

Assistant Curator of Wallcoverings (1 workyear and \$36,000) - Until retirement in FY 1989, a part-time technician was the sole administrator of the Cooper-Hewitt's wallcoverings collection of 8,000 items, one of the world's largest and most comprehensive collections of wallcoverings. This collection requires full-time curatorial care. An assistant curator for wallcoverings will maintain and document the collection, providing scholars an invaluable research tool.

As the sole wallcoverings collection staff member, the assistant curator will have responsibility over all aspects related to the collection. In addition to collections management duties, the assistant curator will photograph and catalogue the wallcoverings collection on color slides. With the entire wallcoverings collection on slides, the staff as well as the public will have better access to the collection. Answering public inquiries and providing researchers with access to the collections are also major functions the assistant curator will perform. Research of the wallcoverings collection by the curator will result in publication of books, brochures, and other materials for use by scholars and the general public. This research also will result in the development of exhibitions on wallcoverings.

The wallcoverings collection is a centralized research facility for architectural historians, restorationists, students, designers, and others who are interested in studying the development of wallcovering design internationally. The collections include tooled leather wallcoverings, Oriental hand-painted papers, and European and American samples of printed paper. In addition, salesmen's sample books, stencils, screens, blocks, and rollers illustrate the manufacturing process as well as the finished product. The requested position will improve not only the Smithsonian's study of wallcoverings but also the research efforts of scholars in the areas of fine and decorative arts, architecture, and domestic life and culture.

Establishment of an Education Department (3 workyears and \$310,000) - The Cooper-Hewitt Museum currently does not have an education department, a situation that limits the Museum's outreach programs. An education staff will enable the Museum to better serve the general public and to reach a more diversified audience.

The main thrust of the education department will be to develop and administer education programs for young people and special audiences. The department will offer outreach curriculum materials, study programs, lectures, brochures, publications, and free programs addressing issues of design. The staff also will develop specialized tours based on the Museum's activities and collections. Trained docents will conduct the tours, free of charge, for school groups. The Museum's education department will establish relationships with the New York City Public School System, private schools, and other leading centers of graduate and professional training in the design and decorative arts fields as a continuing art program and research tool. Self-supporting activities will continue to serve the adult community.

The requested funds will permit the Museum to hire an assistant director of education, an education coordinator, and a secretary. Remaining funds will provide support costs for the department, including printing, equipment, and supplies.

An education department will enable the Cooper-Hewitt to broaden and enhance the services offered to the general public. In addition to adult programming, the Museum will support activities aimed at children and special audiences.

Assistant Curator and Secretary for Decorative Arts (2 workyears and \$59,000)- An assistant curator and secretary in the decorative arts will enable the Cooper-Hewitt to meet its research, collections management, and public service responsibilities.

Currently a single curator serves the Museum's Decorative Arts Department. A second museum professional in the Department will assist in the management of the decorative arts collection, including approving loan requests, fielding public inquiries, identifying objects for acquisition and deaccessioning, cataloguing the collection, and providing liaison with crafts and decorative arts collections elsewhere within the Smithsonian Institution. The assistant curator will also assume collections management responsibilities now performed by the curator, thus permitting that person to undertake in-depth studies, such as the revivalist styles of the 19th century and the iconography of marine life forms found in the decorative arts. In addition, the assistant curator will develop new courses for the Graduate Program and other outreach initiatives.

Also, the professional staff of the Decorative Arts Department is forced to perform many clerical tasks, as the Department's only clerical support is a part-time clerk. The requested secretary will enable Department staff to concentrate on research efforts in the decorative arts.

Although the decorative arts collection, which numbers 20,000 objects, is considerably smaller than the drawing and print collection, it is a working collection used by many design professionals and craftspeople for ideas and inspiration. Its collections include objects of many different materials (glass, ceramics, wood, and metal) and types (architectural embellishments, objects of use, jewelry, and furniture). An assistant curator and secretary will enable the Cooper-Hewitt to maintain and service the decorative arts collection.

Building and Grounds Operational Support (1 workyear and \$124,000) - The Museum's plant consists of three separate structures, one of which is a national landmark; a small conservatory; garden; and parking lot. The Museum seeks funds to properly maintain public portions of the buildings and grounds and the areas occupied by staff. Over the past years, daily attendance, special events, membership activities, and evening programs at the Carnegie Mansion have continued to flourish. Heavy usage places added demands on the Museum's facilities.

With the requested funds the Museum will reinstate and upgrade present service contracts and initiate new service contracts for cleaning and other essential building and grounds maintenance. The Museum will upgrade the following service contracts: trash removal; uniform laundry service; routine window washing; pest control; seasonal grounds, conservatory, and horticultural services; and scheduled painting of nonexhibition gallery interior spaces. Maintenance activities for this urban complex must include a variety of functions performed by the Museum's small maintenance staff and outside contractors. These include graffiti and snow removal; continuous minor fence and sidewalk repair; cleaning, repair, and replacement of carpet; preventive maintenance plastering and painting programs; lighting replacement; and standard janitorial services for offices and specialized cleaning of exhibition and collections storage areas. To maintain the grounds on a daily basis, the Cooper-Hewitt also requires a groundskeeper. Assisting the Museum's 10 member maintenance staff, the requested groundskeeper will ensure the daily upkeep of the garden, parking lot, and other outside areas of the Museum.

The Museum initiated the use of service contracts for a portion of janitorial work in FY 1988, as a result of a highly competitive local labor market and high turnover rate among facilities staff. This pilot experiment was very successful. However, the absence of inflationary allowances has exacerbated the effect of rate increases by vendors in New York City, over whom the Museum often has no bargaining power and to whom the Museum has no practical alternatives for lower-cost service. The cost of trash removal, for example, increased 10 percent in FY 1988 over the cost in FY 1987 and increased another 25 percent in FY 1989.

It has been more than ten years since Cooper-Hewitt has received increased Federal support for building-related expenses. Additional funds are necessary to maintain this facility in a manner befitting a historic landmark and national museum of design.

Fox House Operational Support (5 workyears and \$195,000) - In May 1989, the Cooper-Hewitt Museum acquired a six-story townhouse, Fox House, adjacent to the McAlpin-Miller House. The purchase of this building will alleviate some of the severe space problems the Museum has experienced in the past. To ensure the proper care and safety of the collections and the staff in the building, the Cooper-Hewitt must have adequate levels of operating support.

The Museum's use of the building is currently limited while basic renovations are made, including repair, replacement, or installation of electrical service, plumbing, climate control, and building fabric. Once completed, the renovated Fox House will provide the Cooper-Hewitt with improved collections storage and office space. Eventually, the Museum plans to incorporate the building into its overall expansion plan, connecting all three buildings into a coherent public facility.

To permit adequate maintenance of Fox House, the Cooper-Hewitt requests funds to cover annual operating expenses. Expenses consist of utility costs--gas, electric, water, and sewer; maintenance of the HVAC system; elevator maintenance and repair; maintenance supplies and materials; and custodial, trash removal, and security services. Daily servicing of the facility, such as cleaning, lighting replacement, minor repairs, and security, will require two custodians, two security guards, and a maintenance mechanic.

The Cooper-Hewitt Museum is an international leader in the study of design. The Museum's collections are a major reason for this distinction and require proper storage facilities. Operational support for Fox House will ensure the continued protection and preservation of the Cooper-Hewitt's collections, as well as maintenance of office space for the administrators of the Museum.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - The Museum obtains these funds from a variety of sources, including museum shop sales, product development, individual and corporate memberships, admission fees, donations, fund-raising events, and allotments. The allotments support salaries of the director, administrative officer, three curators, registrar, and various staff members and help defray expenses associated with special events such as exhibition openings. Special purpose funds support the Museum's programs, exhibitions, and publications.

Restricted Funds - Designated for specific purposes, these funds derive from grants, bequests, and other donations from individuals, organizations, and

corporations. In FY 1989, these funds supported exhibitions such as "Courts and Colonies: The William and Mary Style in Holland, England, and America," "L'Art de Vivre: Decorative Arts and Design in France, 1789-1989," and smaller projects. In FY 1990, funds raised will support the exhibitions, "The Intimate World of Alexander Calder" and "Cooper Union Legacy."

In FY 1989, the Museum received a challenge grant from the Andrew W. Mellon Foundation for a permanent research endowment. Other significant fund-raising accomplishments culminating in FY 1989 included grants from the Shell Oil Company and the Dutch American West-India Foundation for "Courts and Colonies"; the Andy Warhol Foundation for the Visual Arts for "The Intimate World of Alexander Calder"; the Peter Krueger-Christie's Foundation, Inc. for an annual fellowship to a promising scholar; the James Smithson Society for the publication of a new Cooper-Hewitt visitor's brochure; Banco di Santo Spirito and the American Friends of the Vatican Library for "Views of Rome"; Van Munching and Co. for "The Modern Dutch Poster"; the Helena Rubinstein Foundation for scholarships in the Graduate Program; and numerous other grants and in-kind gifts or donated services.

Government Grants and Contracts - Various government agencies and departments provide these funds for specific program support. The Museum annually seeks funding in varying amounts from the New York State Council on the Arts for exhibition support and other programs.

NATIONAL MUSEUM OF AFRICAN ART

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	57	3,568	1	47	3	258	-	43	-	-
FY 1990 Estimate	58	3,659	1	51	3	260	-	48	-	-
FY 1991 Estimate	58	3,679	1	61	3	250	-	25	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Museum of African Art (NMAfA) is the only museum in the United States devoted to the collection, preservation, research, exhibition, and interpretation of the visual arts of sub-Saharan Africa. Founded in 1964 as a private nonprofit institution, the Museum became a bureau of the Smithsonian Institution in August 1979 following the enactment of Public Law 95-414. In December 1986, the Museum moved from its original Capitol Hill location to its new facilities on the Mall as a part of the Quadrangle Complex, which opened to the public in September 1987.

For FY 1991, the Museum requests an increase of \$20,000 for curatorial travel.

PROGRAM - NMAfA endeavors to instill an appreciation and understanding of the diverse cultures in Africa south of the Sahara. Although the Museum's primary emphasis is on the traditional cultures of the sub-Saharan region, it also studies and exhibits the ancient and contemporary arts of the entire continent. The Museum develops and presents a variety of interpretive programs including exhibitions, lectures, gallery tours, classes, workshops, audio-visual presentations, and publications. The aesthetics of traditional African art are part of every program, and the Museum actively cooperates and coordinates its activities with those organizations and institutions whose purposes are complementary.

Research - The Museum's program of scholarly publications complements its intensive program of exhibitions. In FY 1989, the Museum published the catalogue Foreheads of the Dead: An Anthropological View of Kalabari Ancestral Screens by Dr. Nigel Barley, curator at the British Museum, to accompany the exhibition "Kalabari Ancestral Screens: Levels of Meaning." The Museum's curators authorized a 20-page color brochure, which was available in the exhibition gallery. During the same year, Dr. Herbert Cole, recent Rockefeller Fellow in residence at the Museum, completed Icons: Ideals and Power in the Art of Africa, a book that will accompany the exhibition of the same name, scheduled to open in early FY 1990. The book, which includes photographs of all the exhibited works as well as field photography of art in Africa, examines five persistent iconographical themes in the history of African art.

Several important collection-related research projects currently in progress will result in publications and exhibitions. For example, archival and oral history research on the life and works of the Yoruba master carver Olowe of Ise. This research, to be published in the first monograph ever devoted to a traditional African artist, has as its basis a major Olowe sculpture donated to the permanent collection. In addition, the first major publication devoted to the Museum's permanent sculpture collection is now in the research stage. Members of the research staff will study, identify, and place on exhibition an extraordinary collection of 85 ceramic vessels from Central Africa. They will also determine the origins and uses of a group of utilitarian objects, including containers, stools, headrests, and pipes primarily from East and Southern Africa, and will place them on exhibition.

In June 1989, the Museum hosted the Arts Council of the African Studies Association's Eighth Triennial Symposium on African Art, the most important regular meeting of African art studies specialists worldwide. More than 250 national and international scholars and specialists took part in more than 100 scholarly presentations. The Museum made abstracts of selected papers available to the participants. A program of films on African art accompanied the symposium. Grants from the Arts Council of the African Studies Association, Shell Companies Foundation, Inc., the National Museum of African Art, and the National Museum of Natural History supported this endeavor.

The Eliot Elisofon Archives, a major research component of the National Museum of African Art, is one of the world's largest photographic archives on African art, cultural history, and environment. Its holdings have grown to more than 140 collections consisting of approximately 200,000 color slides, 78,000 black-and-white photographs, and more than 140,000 feet of motion picture film and video tape.

Among the Archives' most important acquisitions during FY 1989 were 40 cartes de visites and 33 cabinet cards of Senegalese peoples, published by Bonnevide, ca. 1880; an album of 52 postcards of Sierra Leone, ca. 1900-1920; 143 color slides of Ethiopian art and archeological sites, 13th-18th centuries; 326 color slides of art and field images from Ethiopia, the Sudan, and the Niger River; 56 black-and-white prints of the William Brill African Art Collection; and 112 black-and-white copy prints of African art from private collections transferred from the National Gallery of Art to the study file of the Archives.

International scholars and museum staff continue to make extensive use of the Museum's archival holdings. In FY 1989, for example, Archives staff processed 4,538 images in response to requests for slides and prints and also provided research and reference service for exhibitions and publications.

Library - The National Museum of African Art Branch of the Smithsonian Institution Libraries (SIL) system, one of the major African art library collections in the world, provides reference and research support not only for museum staff but for national and international scholars, including those from Africa. As a result of a major acquisitions program from 1985 to 1988, the collection now exceeds 20,000 volumes. The Library continues to develop its collection to serve the expanding research needs of the Museum and the growing number of external scholars and students who make frequent and extended use of library materials through on-site visits and interlibrary loan. The Library is a major contributor in the field of African art bibliography through its new biennial publication, The Arts of Africa: An Annotated Bibliography (Crossroads Press), the first volume of which will appear in September 1989. The Library also continues an active outreach program through the publication

and distribution of the monthly Library Acquisition List to about 700 individuals and institutions worldwide.

Conservation - In the area of ethnographic conservation, the National Museum of African Art has a research facility that allows conservators and resident conservation interns and fellows to contribute to both fundamental and applied research on the materials of ethnographic objects. Staff conservators not only treat objects in the permanent collection but also examine and conserve objects on loan to the Museum. In addition to the 56 objects examined during FY 1989, conservation staff also developed prototype packing techniques for a unique and extremely fragile group of Kalabari (Nigeria) ancestral screens on loan from the British Museum.

Current and future research projects include:

- identification of corrosion processes on West African ironwork to determine appropriate conservation treatment;
- technical analysis of the Museum's collection of Benin (Nigeria) copper alloy objects in cooperation with the Smithsonian Conservation Analytical Laboratory;
- research on a self-contained dehumidification system to permanently reduce the relative humidity in metals storage areas and so arrest electrolyte corrosion;
- examination and radiography of an outstanding Sapi-Portuguese ivory saltcellar, on loan to the Museum, to determine if there has been restoration.

Exhibitions - In the spring of 1989, the Museum opened three exhibitions: "Gold of Africa: Jewelry and Ornaments from Ghana, Cote d'Ivoire, Mali, and Senegal," an important collection of West African gold objects from the Barbier Mueller Museum, Geneva, Switzerland; "Sounding Forms: African Musical Instruments," a major international loan exhibition organized and circulated by the American Federation of Arts; and "The Essential Gourd," an exhibition organized by the UCLA Museum of Cultural History. The Pepsi-Cola Company provided generous support for an extensive public relations campaign and the opening reception for both "Gold of Africa" and "Sounding Forms."

The Museum's FY 1990 exhibition schedule will open in late October 1989 with a major loan exhibition, "Icons: Ideals and Power in the Art of Africa." The exhibition is guest curated by Dr. Herbert Cole, professor of art history at the University of California at Santa Barbara and 1988 Rockefeller Fellow in Residence at the Museum. An exhibition of photographs by Bernard Plossu, "The African Desert," will open in November 1989. "Yoruba: Nine Hundred Years of African Art and Thought," organized by the Center for African Art, and "Portraiture: Sierra Leone Paramount Chiefs," photographs by Vera Viditz Ward, originated by the Museum, will follow.

Future exhibitions will include the installation of an extraordinary collection of 85 ceramic vessels from Central Africa and a group of utilitarian objects including containers, stools, headrests, and pipes primarily from East and Southern Africa. Both collections are important recent additions to the Museum's permanent collection. Also for FY 1991, the Museum is planning "African Reflections: Art from Northeastern Zaire," organized by the American Museum of Natural History, New York.

Development of Collections - The Museum continues to develop its collections by acquiring works of art of outstanding aesthetic quality. An active and continuing acquisitions program, through purchase and gift, remains one of the Museum's highest priorities. The collection is the basis for exhibitions, public programs, and research.

In FY 1989, noteworthy gifts included a rare Yoruba palace door carved by Olowe of Ise (Nigeria), a Tiv chair, a Bassa mask (Liberia), a rare Kongo cast copper bracelet (Zaire), and an East African gourd with a figurative stopper. Through purchase, the Museum acquired a Chamba standing male figure (Nigeria), a Kwere gourd with a seated female figure (Zambia), and 15 utilitarian objects primarily from East and Southern Africa. A grant from the James Smithson Society made possible the acquisition of a collection of 75 utilitarian objects primarily from East and Southern Africa. With funds provided by the Collections Acquisition Program of the Board of Regents, the Museum acquired a major collection of 85 ceramic vessels from Central Africa. These important works are a major addition to the national collection of African art that the Museum is selectively building.

Education - The National Museum of African Art develops and presents a variety of programs to increase public awareness and understanding of African art. Interpretive programs such as lectures, films, gallery talks, and workshops supplement an active exhibition schedule. These programs offer a range of opportunities and incentives for learning about Africa and its artistic heritage. During FY 1989, the Museum offered more than 1,200 public programs, serving more than 40,000 visitors. An additional 3,000 individuals in senior care centers and hospitals participated in the Museum's various outreach programs. Through the Museum's film lending program, videotapes on African art reached an estimated audience of more than 6,000 individuals.

In FY 1989, the Museum hosted the National Art Educator's Conference and gave teacher workshops to more than 300 local educators. The Museum's education staff participated in the D.C. Public Schools Chapter 1 Museum Project by offering a structured series of programs on African art and culture to elementary classes from McGogney Elementary School and Green Elementary School. In conjunction with the D.C. Chapter of the Links, the education staff developed a series of gallery discussions, workshops, films, and slide programs for female high school students. The Museum also continues to sponsor classes and lectures on African art each year in conjunction with other Smithsonian programs, universities, and outside organizations.

The Museum's docent training program ensures that knowledgeable volunteer guides are available to conduct tours and other educational programs. To serve the thousands of visitors who participate in docent-led gallery tours, the Museum recruited and trained 40 new docents in FY 1989. The active docent corps now numbers nearly 100.

In its continuing effort to assure that the Museum's education programs successfully reach the broadest possible audience, the Museum plans to evaluate program quality during FY 1990. Also in FY 1990, the Museum's pretour materials for teachers will include background on African geography, history, culture, and contemporary art in addition to information on specific art programs. These improvements come in response to requests from teachers, docents, and museum staff, who find that visiting students understand African art better if they have a basic knowledge of the continent and its people before they arrive at the Museum.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Museum requests an increase of \$20,000 for curatorial travel.

Curatorial Travel (\$20,000) - Curatorial research is the foundation for scholarly publications, collection documentation, development of the Museum's Eliot Elisofon Archives, and future exhibitions, all of which enhance knowledge of the art of Africa and the cultural heritage of African Americans. This research must include travel in Africa, Europe, and the United States to examine works of art and consult with other specialists.

Major curatorial research projects now pending require travel funds in excess of those currently available. One research project on the life and work of the most important Yoruba sculptor of traditional art in this century, Olowe of Ise (Nigeria, d. 1939), requires travel in England, Nigeria, and the United States. This research, generated by the donation to the Museum's permanent collection of a primary work by this artist, will result in the first monograph on an individual artist in the history of African art studies; it will be of interest to general readers as well as scholars.

Another project involving extensive research on sculpture from Cote d'Ivoire will result in a major exhibition and accompanying book. Travel in Africa and Europe is mandatory to conduct this research.

The funds requested will pay the costs of travel to Africa, Europe, and within the United States in support of these and future research projects. The National Museum of African Art, as the only museum in the United States devoted to the collection, preservation, interpretation, and exhibition of the visual arts of Africa, must take the lead in research of this type. Such research increases the scholarly knowledge and understanding of African art and fosters stronger ties with the nations of Africa.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds come from the Museum's share of net proceeds from the museum shop, courses conducted in cooperation with Washington metropolitan area public education institutions, and allotments. NMAfA uses these funds to provide additional support for the Museum's education and collections acquisition programs, exhibition openings, publications, and travel costs associated with meetings of the Museum's commission. In FY 1990, an allotment will also support the salary costs of one employee. Funds are available from the Smithsonian's Collections Acquisition Program and Special Exhibition Fund to support research and exhibition projects.

Restricted Funds - Individuals, foundations, organizations, and corporations contribute these funds in the form of grants and gifts for specific purposes. Also, the Museum receives income from a collections acquisition endowment established in FY 1988. In FY 1989, a grant from the James Smithson Society made possible the acquisition of an important group of 75 utilitarian objects, including containers, stools, headrests, and pipes, primarily from East and Southern Africa. A generous pledge for donations over a five-year period, begun in 1988, augments the Museum's federal publication funds. A grant from the Women's Committee of the Smithsonian National Associates Program enabled the Museum to acquire the videotape series, Things Fall Apart, based on a novel by the celebrated Nigerian author Chinua Achebe, for its public education program on the Igbo people of southeastern Nigeria. A contribution from a private donor provided direct support for special events associated with the "Gold of Africa" exhibition.

ANACOSTIA MUSEUM

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	20	1,010	1	44	-	-	-	-	-	-
FY 1990 Estimate	21	1,050	1	47	-	-	-	-	-	-
FY 1991 Estimate	22	1,149	1	57	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Located at Fort Stanton Park in southeast Washington, D.C., approximately six miles from the Mall, the Anacostia Museum is a national resource on African-American history and culture in America. The Museum's exhibitions, scholarly and applied research, historical documentation, and interpretive and educational programs offer scholars and the public the opportunity to study the history and culture of black America from a unique, multi-ethnic perspective.

For FY 1991, the Anacostia Museum requests an increase of 1 workyear and \$99,000 to initiate a visitor shuttle service to bring school groups and visitor groups to the Museum.

PROGRAM - The Anacostia Museum is a national prototype for scholarly and applied research, historical documentation, exhibitions, and educational programs that interpret for the public the experiences of African Americans and their contributions to science, history, and the arts. The Anacostia Museum collaborates with other Smithsonian museums and programs, when possible, to conduct research and develop exhibitions on subjects related to African-American history and culture.

Established in 1967 as a cultural resource for the people of Anacostia, the Museum has developed more broadly into a museum on African-American history and culture. Today it is a valuable source of materials on African-American history, working with other museums and research institutions, universities, and archives throughout the United States to enhance the awareness and appreciation of the historical and cultural contributions of African Americans to American society. The Museum has developed innovative ways for introducing nontraditional museum audiences to the worlds of science, history, and the arts. The Museum is an active member in several professional museum associations including the American Association of Museums and the African American Museums Association.

Research - Since its founding in 1967, the Anacostia Museum has documented the history and culture of African Americans and their significant contributions to the heritage of this nation. During the past few years, the Museum has strengthened its research capabilities and expanded its exhibition program. Funds provided in FY 1989

to hire a professional registrar and librarian will further strengthen these research capabilities.

The new registrar position will strengthen the research department's curatorial functions. The registrar will coordinate loan requests, examine artifacts, and supervise the handling, mounting, and storage of artifacts. In addition, the registrar will catalogue the Museum's growing permanent collection and serve as liaison between research department historians and design and production department staff.

The new librarian position will be responsible for Anacostia's reference library collection, which consists of approximately 1,500 volumes including serial runs and sets of encyclopedias. The librarian's duties will include organizing and cataloguing the current collection; purchasing and cataloguing new books; borrowing books through inter-library loan for use by Anacostia staff; updating files using the automated Smithsonian Institution Bibliographic Information System (SIBIS) and other national bibliographic data bases; maintaining a circulation desk for both the Museum staff and the public; and answering all public inquiries relevant to the library collections. During FY 1989, the Anacostia library became part of the Smithsonian Institution Libraries (SIL) system. Inclusion in the SIL system greatly enhances the Museum's research capabilities by giving it access to SIL's personnel recruitment, training preservation, and automated cataloguing services.

During FY 1989, the Museum conducted research on two exhibitions scheduled for FY 1990 and FY 1992:

- "P. H. Polk: The Man and His Work," scheduled to open in late FY 1990, will feature Prentice H. Polk's photographic depiction of 20th-century southern folklife. It will include vintage and signed prints from the P. H. Polk estate, Tuskegee University archives, and private lenders and galleries. Born in 1898, Polk was a photographer whose documentation of southern folklife spanned more than half a century and gained national recognition during the last decade of his life. In addition to Polk's photographs, videotape excerpts of television interviews with Polk conducted by NBC, CBS, and MetroMedia News will allow visitors to learn more about the man himself as well as his work. Louise D. Hutchinson, former director of research at the Anacostia Museum, is the guest curator.
- "To Achieve These Rights: The African-American Struggle for Equal Rights in the District of Columbia, 1791-1991" (working title) is scheduled to open early in FY 1992. Commemorating the bicentennial of the District of Columbia, the exhibition will examine, from a legal history perspective, the struggle by African Americans to secure equal rights in the Nation's Capital. It will focus on how the laws of Congress and the District have affected African Americans and how African Americans have sought to change the laws.

Collections Management - During FY 1989, the Museum completed its collections management policy and sent it forward for the Institution's review. Institutional endorsement of this policy is an essential prerequisite for the establishment of a permanent Anacostia collection. Also in FY 1989, the Museum completed an inventory of its current collection of 5,000 valuable books, letters, photographs, and artworks.

Exhibitions at the Museum - The Anacostia Museum presented "Inspiration: 1961-1989," a retrospective showing of art created by 35 members of the District of Columbia Art Association (DCAA), from January to March 1989. It included such well-known and respected African-American artists as Richard Dempsey, Lois Mailou Jones, Alma Thomas, and James Wells. Representing a wide range of visual expression, the 62 works in the exhibition displayed media such as acrylic, oil, colored pencil, collage, watercolor, pen and ink, and mixed media on plywood and copper. A catalogue chronicling DCAA's history accompanied the exhibit.

"The Real McCoy: African-American Invention and Innovation, 1619-1930," which opened to the public on May 21, 1989, earned widespread media coverage and an enthusiastic reception from visitors. It examines the synthesis of African, native-American, and European technologies during the early colonial period. It also studies the impact of slavery on African-American invention and the achievements of 19th- and 20th-century African-American inventors. During three years of research, the curator located more than 150 artifacts in many states, including Alabama, California, Hawaii, Massachusetts, Michigan, and Ohio. Highlights of the exhibition include:

- archeological artifacts illustrating African technological traditions in 17th-century America;
- 18th-century woodworking tools by Cesar Chelors, the first identified African-American toolmaker;
- patent models submitted to the U.S. Patent Office by African-American inventors;
- manufactured goods by innovative African-American entrepreneurs;
- prototypes of the modern gas mask and traffic signal invented by Garrett Morgan.

A catalogue accompanies the exhibit. The Museum is currently producing an interactive video on inventiveness and problem-solving geared toward young African-American visitors. It is set for completion in the fall of 1989.

Traveling Exhibitions - The Anacostia Museum has produced several traveling exhibitions related to the history, culture, and achievements of African-Americans. These include "Out of Africa"; "The Frederick Douglass Years"; "Black Women: Achievements Against the Odds"; and "Mary McLeod Bethune and Roosevelt's 'Black Cabinet'." These traveling exhibitions, circulated by the Museum and by the Smithsonian Institution Traveling Exhibition Service (SITES), allow the Museum to reach a diverse national audience. SITES' brochure, "Black History and Ethnic Studies Exhibitions from the Smithsonian Institution," highlights 16 SITES exhibitions currently available for travel, including "Black Women" and "Out of Africa," that are of particular interest to institutions looking for traveling exhibitions in these fields.

"Black Women: Achievements Against the Odds" profiles the lives, careers, and accomplishments of 200 African-American women. Among them are Madame C. J. Walker, America's first African-American millionaire; Edmonia Lewis, one of the first African-American female artists to gain international recognition; civil rights activist Rosa Parks; performer Bessie Smith; and former congresswoman Barbara Jordan.

"Out of Africa" documents the early chapters of African-American history. It addresses the trans-Atlantic slave trade, slave life in the American colonies, the abolition movement, and colonization efforts by free African-Americans in West Africa.

SITES has selected two additional Anacostia Museum exhibitions for its program: "The Real McCoy" and "Climbing Jacob's Ladder: The Rise of Black Churches in Eastern American Cities, 1740-1877." Several institutions and organizations, including the U.S. Patent and Trademark Office and the U.S. Patent Model Foundation, have already expressed interest in a traveling version of the "The Real McCoy." "Climbing Jacob's Ladder" will go on tour as early as April 1990. The Museum is currently redesigning three other SITES traveling exhibitions--"Out of Africa," "The Frederick Douglass Years," and "Mary McLeod Bethune and Roosevelt's 'Black Cabinet'"--in lightweight formats that will be suitable for community centers, schools, and other nontraditional sites for Smithsonian exhibits.

Public Education and Orientation - During FY 1989, the Anacostia Museum presented a variety of public programs to complement "Inspiration: 1961-1989." Exhibiting artists participated in the show, helped to plan programs, served as panelists, conducted tours, and presented demonstrations that ranged from etching to portrait paintings.

FY 1989 public programs for "The Real McCoy" included sessions during which visitors and local inventors explored the process of inventing, patenting, and marketing. Visitors also learned more about historical inventors and innovators through films, videos, lectures, workshops, and seminars. Programs included:

- "So You Want to be an Inventor," a seminar for adults describing the patent process as well as the trials, tribulations, and pitfalls of being an inventor;
- "Inventors for a Day," a workshop led by the education department staff at which children, assisted by their parents, developed their own inventions and innovations;
- teacher workshops and seminars that suggested strategies for teaching about African-American inventors, creativity, and the patent process;
- films and videos on Dr. George Washington Carver, Madame C. J. Walker, and Benjamin Banneker.

Lunch Box Forums at the Museum included lectures by Frank O. Price, inventor of the game "Quarterback Draw Football," and Cortland O. Dugger, who developed barium magnesium aluminate, also known as Duggerite. Mr. Dugger explained his continuing work with electromagnetic conductors. The Museum also presented the forum, "A New View: Black Women as Artists."

The Friends for the Preservation of Afro-American Culture, organized by Anacostia's education program in 1988, draws participants from the Washington metropolitan area interested in preserving African-American culture. Guest speakers at the monthly sessions have included Karen Jefferson, curator of manuscripts at Howard University's Moorland-Spingarn Research Center; James Walker, associate director of the Sumner School Museum and Archives; and Louise D. Hutchinson, former director of the Museum's research department.

During the summer of 1989, one hundred children from throughout the Washington metropolitan area attended the popular Aerospace Workshop, sponsored jointly by the Museum and the National Air and Space Museum (NASM). Supported by a grant from the Smithsonian Educational Outreach Program, the workshop's unique curriculum taught children to build and fly kites and hot air balloons. They also learned about African-American contributions to aviation and space and visited NASM and the Goddard Space Flight Center.

On June 19, 1989, the Museum sponsored a Juneteenth celebration to commemorate the day Texas slaves received formal notification of their freedom--two and one-half years after the fact. Events included tours of "The Real McCoy" and demonstrations of quilting, doll making, cartooning, tie dyeing, and braiding. Visitors enjoyed entertainment ranging from Texas-style blues and jazz to gospel music, poetry, storytelling, and African drumming and dancing. The Fort Stanton Civic Association, officers from the D.C. Police Department's Seventh District, the D.C. Recreation Department, several Smithsonian offices, and a citizen advisory committee assisted the Museum in the celebration.

Future Space Needs of the Museum - In May 1987, the Anacostia Museum opened its new public exhibition and education facilities at Fort Stanton Park. The expanded facility provides better visitor services, including off-street parking, and houses formerly dispersed museum programs.

The Museum will soon draft a master plan to determine the long-range space needs for its research, exhibition, and public service programs. This plan will reflect long-range requirements for artifact storage and space for exhibitions and staff. It will also assess the need for an auditorium to accommodate the large numbers of people who attend the Museum's educational programs. The Museum will evaluate different alternatives for future facilities development. Relocating the Museum to National Park Service land at Poplar Point, near the future Anacostia Metrorail Station on the Green Line is among the alternatives.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Anacostia Museum requests an increase of 1 workyear and \$99,000 to initiate a visitor shuttle service to bring school groups and visitor groups to the Museum.

Initiate Visitor Shuttle Service (1 workyear and \$99,000) - During FY 1988, the first complete fiscal year in its Fort Stanton Park location, more than 37,000 people visited the Anacostia Museum. However, because of its location approximately six miles from the Mall, it is not always convenient for large school groups, senior citizens, and other visitor groups to travel to the Museum. In addition, with the development of a greater African American presence in the exhibitions and public programs in the Smithsonian museums on the Mall, visitors on the Mall will have an increased interest in visiting related exhibitions and programs at the Anacostia Museum.

To make a visit to the Anacostia Museum more accessible to these special groups and to individual Mall visitors, the Museum plans to initiate a visitor shuttle service to bring school groups and other visitor groups to its Fort Stanton Park location. This shuttle will enable visitors to include the Anacostia Museum as a regular part of their visit to the Mall.

The requested increase will allow the Museum to purchase a bus (\$71,000) and hire a bus driver (1 workyear and \$28,000) to initiate this shuttle service. The bus will

seat 36 passengers and be equipped with a wheelchair lift for handicapped accessibility, seat belts, and air conditioning. Support for the position of bus driver includes uniforms, supplies, and training. In FY 1992 and following years, the Museum will use the funding provided for the bus purchase for the continuing maintenance and operating costs of the bus.

The initiation of this shuttle service will improve access to the Museum for Washington metropolitan area public schools, senior citizens, and other groups, as well as make it easier for visitors at the Mall museums to get to Anacostia. The shuttle will thus improve the Museum's service to visitors from the Washington, D.C. area and from communities from across America, and enhance the Museum's ability to bring the experiences of African Americans and their contributions to science, history, and the arts to a wider audience.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - An annual allotment supports the salary and benefit costs of an exhibit specialist. During FY 1989, the exhibit specialist completed new exhibit cases and other display materials for "The Real McCoy." In FY 1990, the exhibit specialist will build and finish all necessary exhibit components for the P. H. Polk exhibition. He also will construct special packing crates for traveling exhibitions.

Additional funds derived from donations and exhibition rentals purchase supplies and materials to support the Anacostia Museum's programs.

Restricted Funds - These are gifts that organizations and individuals have designated to support specific Anacostia Museum programs.

CONSERVATION ANALYTICAL LABORATORY

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	41	2,519	-	-	-	43	-	-	-	-
FY 1990 Estimate	42	2,628	-	-	-	50	-	-	-	-
FY 1991 Estimate	44	2,999	-	-	-	50	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Conservation Analytical Laboratory (CAL) located at the Museum Support Center in Suitland, Maryland, is the Smithsonian's specialized research facility for the conservation and technical study of museum objects. CAL helps the Smithsonian and other museums in the study, preservation, and conservation of objects of artistic, scientific, cultural, and historical importance. CAL staff examines the conservation-related properties of these materials, extracts historical information from their technical record, and improves conservation treatment technology. Staff conservators apply the knowledge gained from scientific research directly to the actual treatment of objects. Experience with a wide range of materials and expertise in analytical and technological studies enables CAL to engage successfully in a spectrum of interactive and collaborative research with anthropologists and art historians. The diversity and the wide variety in the state of preservation of objects in the National Collections provide the overview needed to define directions in conservation research. CAL also conducts a conservation training program that includes basic and advanced conservation training, supports and organizes workshops and seminars, and disseminates the latest knowledge in the field of conservation and cultural materials research to museums and research professionals throughout the United States and the world.

For FY 1991, the Conservation Analytical Laboratory requests an increase of 2 workyears and \$371,000 to develop a research program for the preservation of natural history specimens (1 workyear and \$83,000); to support chemical analysis of archeological materials (1 workyear and \$48,000); and to upgrade or replace research equipment (\$240,000).

PROGRAM - Archaeometry - CAL scientists develop or apply methods of chemical and physical analyses of museum objects and related materials and integrate the results of these analyses with archeological, anthropological, or art historical data on the objects and materials. These analyses provide data concerning materials, dates, provenances, attributions, and historical technologies that, in combination with contextual information and typological and stylistic analyses, help answer questions on the history of these objects and the cultures from which they derived.

During FY 1989, CAL scientists, in collaboration with scholars representing institutions from all over the world, engaged in several archeological projects involving both the Old and the New World. Using CAL's facilities for neutron activation analysis at the National Institute of Standards and Technology (NIST), scientists analyzed ceramic artifacts and clay sealings and tablets from the sites of Tell Leilan in Syria and Tepe Gawra, Nineveh, Arpachiyah, and Tell Brak in Northern Mesopotamia as part of a study of settlement trends and the emergence of social complexity. Using the same analytical technologies, scientists analyzed 16th-century Spanish majolica samples excavated by collaborating Spanish archeologists at kiln sites in Seville. This work is part of a project that examines the supply of Spanish colonial sites in the New World. In collaboration with other United States universities and museums, CAL researchers expanded the analytical work on archeological native-American ceramic artifacts to evaluate historical, social, and economical relationships among various native-American groups.

The lead isotope spectrometry program focused on early Bronze Age tin sources in Anatolia. Analyzing samples from an ancient mine in the Taurus Mountains and from archeological artifacts from that region, CAL researchers found evidence that the mine was a source of tin during this period. As part of a collaborative agreement with researchers at the National Research Institute for Cultural Properties in Tokyo, CAL made preparations for the exchange and shared use of lead isotopic analytical data. Within the framework of the same agreement, researchers initiated a joint research project on the technological development of Jomon ware, a prehistoric pottery from Japan. Other examples of ceramic technology research include work on prehistoric figurines from the Dolne Vestonice site in Czechoslovakia.

Using neutron activated autoradiography along with more conventional methods of examination, CAL's research in art history focused on the work of the 19th-century American artist Albert P. Ryder. CAL staff, in collaboration with curatorial and conservation staff at the National Museum of American Art examined nine paintings by this artist as part of the scholarly preparations for a special exhibit of his work planned for 1990.

Conservation Science - CAL's conservation science program pursues research in the chemical and physical deterioration processes of materials in museum collections and the rates that affect these processes. By specific Smithsonian requests, CAL scientists perform chemical, physical, and other technical analyses for conservators and curators Institution-wide.

In a cooperative program with the National Gallery of Art and the Canadian Conservation Institute, CAL scientists examined the mechanical effects of temperature, relative humidity, shock and vibration on paintings in transit. The results will be discussed at an international conference on art in transit at the Tate Gallery in London in 1991.

CAL scientists implemented a research program to study the effects of cleaning solvents on oil paint layers. In order to prepare paint standards for this research, CAL scientists and conservators examined the historical evidence for various methods of oil extraction and purification and obtained adequate supplies of appropriately treated oils and traditional pigments.

CAL researchers examined large numbers of historical wet collodion glass negatives to systematically characterize manufacturing techniques and to identify materials. This work precedes characterizing the deterioration processes of these

plates. It will lead to recommendations for conservation treatment, printing, exhibition, storage, and handling of these materials.

In a new biogeochemistry program, CAL scientists studied lactating and nursing habits in a hunter-gatherer society by applying isotope spectrometry to individual amino acids derived from protein extracted from archeological human bone. The study of ancient disease patterns by identifying specific antibodies in archeological skeletal material continued.

Researchers concerned with the characterization and kinetics of polymer degradation brought the research on the aging of cellulose into a second stage and evaluated mildly accelerated aging conditions for their appropriateness in testing the long-term behavior of cellulosic materials. A new project in this area addresses the urgent need for research into the degradation of modern polymeric materials, which have been used in the manufacture of many artistic and historic objects collected over the last century.

Conservation Technology: Research and Treatment - CAL conservators pursue a variety of projects aimed at the development, improvement, and testing of treatment technology. They also provide technical advice and assistance to Smithsonian bureaus with problems requiring their special expertise.

Besides being involved in research of solvent action on paint films, CAL's painting conservators developed innovative preparation techniques for cross-sections and thin-sections from paintings. This technique allows more economical use of microscopical samples for examination and analysis. The conservators provided treatment assistance to the National Air and Space Museum (NASM), the Cooper-Hewitt Museum, and the National Museum of American History (NMAH), including the study and treatment of Thomas P. Dewing's paintings that adorn the 100,000th Steinway piano.

Paper conservators continued evaluating the effects of treatments that involve washing in various solvents, including water, and drying under various conditions on the optical, chemical, and mechanical properties of paper. This type of work also included coated papers, which by their very nature present special problems. Paper conservators assisted the Smithsonian Institution Archives by surveying collections of watercolors, paintings on paper, and drawings. Similarly, they surveyed collections of botanical drawings and gouache paintings on photographs in the National Museum of Natural History (NMNH). Conservators also provided treatment assistance to the National Museum of American Art (NMAA) and NMAH.

Research in textile conservation included developing protocols for the use of modern synthetic dyes to match historic natural dyes for restoration purposes and the effects of pesticides on the lightfastness of textile dyes. Assistance to other bureaus included treatment of a 30-foot parabolic reflector for NASM and development of a method for removing pencil marks from a color field painting for NMAA. In an international assistance project made possible through funding by the Asian Cultural Council, CAL provided expert advice in situ for museums in Singapore, Jakarta, and Manila.

CAL's objects conservators investigated the effectiveness and appropriateness of various consolidants for the mechanical strengthening of fragile archeological plasters. Another research project examines the historical use of zinc as a sculpture medium. The conservators surveyed objects in Jakarta in preparation for the "Java Seas" exhibition at NMNH and performed treatments for the Anacostia Museum and the

Arts and Industries Building. One objects conservator provided on-site conservation and training assistance for the excavation at Harappa, Pakistan.

The research interests of CAL's furniture conservators centered on characterizing historic furniture finishes and the abrasiveness of various packing materials to furniture finishes. Treatment assistance was provided to the Cooper-Hewitt Museum and NMAH.

Conservation Training - CAL offers a variety of training opportunities in conservation at different levels of expertise and experience. The graduate-level furniture conservation training program finished its third year, with the first class completing its course work. The students of this class will serve internships at various museums next year as a last requirement before graduation. Meanwhile, CAL selected seven new students from a large number of applicants to form the second class, starting in late FY 1989.

In the second year of the joint CAL - Johns Hopkins University program for graduate training of conservation scientists, CAL staff organized and taught two semester courses on the properties of inorganic materials in museum objects and on the principles and practices of conservation. The three students enrolled in the program have selected research topics for their doctoral theses: the degradation of silk, the nondestructive detection of interior defects in wooden artifacts, and the deterioration of archeological glass. On a CAL postdoctoral fellowship in conservation science, a scientist is studying the nature of coatings on Benin bronzes in the National Museum of African Art (NMAfA) collections and their implications for the conservation of these objects.

CAL awarded six recent graduates from academic conservation training programs postgraduate internships in the Smithsonian; two of these interns worked at CAL, while the other four served at various Smithsonian museums. CAL also hosted other interns at less advanced levels of experience: six students spent summer internships with CAL's textile and paper conservators; two students in academic conservation training programs spent internships at CAL during the year; and two preprogram interns who spent the year at CAL were subsequently accepted into academic training programs. A chemist from the National Museum in Jakarta worked for three months with the textile conservator.

Again, CAL organized several advanced training courses for conservators in various specialties. The eight courses outside the furniture conservation training program included: Conservation of Earth Science Collections; Theory and Applications of the Paper Suction Table; Color Theory and Measurement; Materials Used for Display of Collections; Analysis of Historic Textile Dyes; Textile Pest Control; and the Use of Modern Textile Dyes in Conservation. In addition, the four courses in this year's furniture conservation training program curriculum were available to professionals outside the program.

Information - CAL's information program provides specialized bibliographic and reference research support to professionals in the Smithsonian Institution and other museums. It maintains current information files on conservation and archaeometry literature, technical information, commercial products data, and internally generated reports. Users can access data on CAL Conservation Reports electronically through the Smithsonian Institution Bibliographic Information System (SIBIS). CAL maintains on-line access to the conservation literature data base of the Bibliographic Conservation Information Network (BCIN), which includes the Art and Archaeology

Technical Abstracts (AATA), and to the materials information data base MCIN. Both BCIN and MCIN are parts of the international Conservation Information Network (CIN), a cooperative network founded by the Getty Conservation Institute in cooperation with CAL, the Canadian Conservation Institute, the International Center for Conservation (ICROM) in Rome, the International Council of Museums (ICOM) in Paris, and the International Council of Monuments and Sites (ICOMOS), also in Paris. CAL devotes considerable staff effort to integrate these institutional data bases, which are available to conservators worldwide. New accessions further increased CAL's unique collection of reprints from the professional literature in conservation, archaeometry, and related subjects, and this resource now contains about 22,000 reprints.

The public information program continues to provide information in response to questions from an audience ranging from the general public to conservation professionals. On the average, CAL answers 60 questions from the general public and 25 from professionals each month. The CAL Information staff also performs an average of 12 data base searches per month, half of which are done on request from other CAL staff, one-quarter for other Smithsonian professionals, and one-quarter for professionals in museums outside the Institution. In addition, CAL has given out more than 1,300 copies of its 165-page text Approaches to Pest Control in Museums in answer to questions and as supplements to courses since its publication in FY 1986.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Conservation Analytical Laboratory requests an increase of 2 workyears and \$371,000 to develop a research program for the preservation of natural history specimens (1 workyear and \$83,000); to support chemical analysis of archeological materials (1 workyear and \$48,000); and to upgrade or replace research equipment (\$240,000).

Preservation of Natural History Specimens (1 workyear and \$83,000) - The Smithsonian's National Museum of Natural History collections are a national resource used by researchers nationwide. Similarly, extensive collections in other natural history museums are important to researchers in the biological and earth sciences. Yet, little research has been done on issues affecting the preservation of these priceless and irreplaceable scientific collections.

Preservation of natural history specimens is more complicated than for other types of museum collection, such as works of art. First, the size of the scientific collections in a natural history museum are several orders of magnitude larger than a typical art museum collection, thus rendering the single object orientation, typical in the latter, unusable. Second, the processing of newly collected biological materials introduces an extra step that can seriously affect the preservation of the specimens. Finally, the research use of these collections severely restricts chemical or other interventions that researchers can use to stabilize them. New biological science research techniques, especially on the molecular level, require the integrity of the original material, with no changes in the chemical make-up of the specimens that could affect the outcome of research experiments. Existing preservation treatments do not meet these standards. Consequently, their influence on the later use of specimens is largely unknown, and new techniques that avoid the potential destruction of research information do not yet exist.

The Conservation Analytical Laboratory, which specializes in research concerning the conservation of museum collections, is uniquely qualified to undertake the urgently needed research into the preservation of natural history specimens. Contacts with natural history collections outside the Smithsonian as well as NMNH have resulted in the formulation of a research program and the establishment of collaborative ties.

To take responsibility for this research, CAL will hire a scientist (1 workyear and \$83,000).

This program will produce data that will enable natural history museums across the Nation to make informed decisions on preservation and conservation techniques for processing and managing their unique and often irreplaceable collections. It is expected that in the future, the program will grow appreciably, with much research being done by postdoctoral fellows funded through outside support.

Chemical Analysis of Archeological Materials (1 workyear and \$48,000) - Operating two spectrometers 24 hours a day will accommodate scholars who collaborate with CAL staff and various archeological investigations. At the research reactor of the National Institute of Standards and Technology (NIST), and as part of a cooperative program with NIST, CAL operates a dedicated facility for trace element analysis of archeological materials. The extreme care bestowed on the design of analytical procedures and instrumentation has led to an unequalled precision in the data obtained. In addition, CAL operates the Smithsonian Archaeometric Research Collections and Records (SARCAR), which contains a large computer data base of analytical data derived from archeological artifacts worldwide. The combination of high-quality analyses, the extensive data bank, and a package of sophisticated statistical techniques used in the interpretation of the data have created a unique environment for state-of-the-art archeological science.

CAL's facilities for neutron activation analysis constitute an internationally renowned resource for archeological provenance analysis of ceramic or lithic materials. The concomitant increase in samples submitted in the course of collaborative research projects has necessitated a significant increase in the capacity of this facility. To accommodate the increased demands for analyses, CAL built and installed a second gamma spectrometer system. This system doubles the capacity of the facility and will enable analysis of 2,500 samples of archeological material per year.

While CAL has added the necessary instrumentation, a laboratory technician (1 workyear and \$48,000) is needed to operate the system and thus ensure greater productivity.

CAL's dedicated analytical facilities for archeological research are a unique national resource. Increasing staff will ensure that CAL reacts positively to proposals submitted by scholars from universities and institutions worldwide for collaboration on important archeological investigations.

Upgrade or Replacement of Research Equipment (\$240,000) - The Conservation Analytical Laboratory provides a unique setting for interdisciplinary research between the physical sciences and the humanities. Establishing a periodic upgrade and equipment replacement program will safeguard the Laboratory's ability to maintain its leadership.

In recent years, CAL acquired an international reputation for leadership in the interdisciplinary research areas of archaeometry and conservation. This position manifests itself in the publication record resulting from projects involving CAL staff and collaborating researchers from universities and museums worldwide. CAL also serves as a major study center in these fields, with many scholars and students participating in various opportunities offered at the laboratory.

The research conducted at CAL requires the cyclical replacement of very sophisticated scientific equipment to keep pace with advances in technological innovations. While CAL has utilized both Federal and Trust support on many occasions to acquire state-of-the-art instrumentation needed for the pursuit of its scientific activities, its current base resources are insufficient for CAL to institute a systematic program of updating and replacing research equipment.

Such a program is essential for CAL to maintain its position in the forefront. In general, scientific equipment has a limited lifetime, after which repair costs can mount to substantial levels and replacement parts become virtually impossible to obtain.

With the requested funds, CAL will initiate a replacement program to update older and obsolete scientific equipment and introduce new analytical technologies into its research programs. Some examples of the equipment that CAL will replace or update are the gas chromatograph mass spectrometer, scanning electron microscope plus analysis attachments, Diffractometer, VIS/UV spectrometer, FTIR Spectrometer and IR microscope, special photographic equipment, and mechanical test equipment. These improvements will enable the Laboratory to maintain its high standards of scientific research in archaeometry and conservation, and preserve the Nation's cultural heritage.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These derive from the fees charged to participants in the advanced conservation specialist programs sponsored by CAL. These fees partially offset the expenses incurred in organizing the courses.

OFFICE OF EXHIBITS CENTRAL

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	46	1,900	-	150	-	-	-	-	-	-
FY 1990 Estimate	46	1,963	-	150	-	-	-	-	-	-
FY 1991 Estimate	50	2,175	-	150	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Exhibits Central (OEC) is essential to the success of many Smithsonian exhibitions. OEC's specialists and up-to-date facilities offer expertise in all phases of exhibit design and production to Smithsonian units with little or no exhibition capability. Most OEC projects are unique and involve the exhibition of objects from the Institution, other museums, and private collections.

For FY 1991, OEC requests an increase of 4 workyears and \$212,000 to expand the exhibition production services it makes available to Smithsonian museums (2 workyears and \$106,000) and to manage exhibition spaces not attached to specific bureaus (2 workyears and \$106,000).

PROGRAM - The Office of Exhibits Central provides comprehensive service and expertise in exhibition design and production. "Inside Active Volcanoes: Kilauea and Mount St. Helens," produced in FY 1989 for the Smithsonian Institution Traveling Exhibition Service (SITES), provides a sample of the range of OEC work:

- Design. OEC designed every feature for the SITES' traveling exhibition and for the installation in the Evans Gallery at the National Museum of Natural History, from exhibit cases to interpretative text panels, and from gallery wall colors to the placement of objects in cases.
- Editing. OEC received large portions of the script in outline form. The OEC editor researched, using materials provided by the curators, and wrote or rewrote the majority of the copy. In addition to shaping the script to support the photographs and objects, OEC edited and structured the script to be informative to a lay audience.
- Graphics. OEC's graphics laboratory silk-screened labels, text panels, diagrams, and maps and mounted photographs.
- Models. OEC's model shop fashioned two full-scale dioramas, one to depict the destruction caused by the Mount St. Helens eruption incorporating a tree stump from the actual blast zone, and one to depict a forest flooded with

lava from Kilauea. The model shop also produced a scale model of a lava lake at Kilauea with cutaway view and a drilling rig, and a cutaway model of Kilauea showing the dikes along the rift zone. The model shop also prepared custom brackets and mounts for all the artifacts.

- Fabrication. OEC built all the exhibit furniture, including text and photo panels, wall-hung vitrines, freestanding exhibit cases, pedestals, and all the acrylic vitrines. OEC also built shipping containers with custom interiors that will ensure the safety of the objects and exhibit components during travel.

Although "Inside Active Volcanoes" was the largest and most complex project in FY 1989, OEC completed more than 200 other projects, supporting nearly every Smithsonian office and bureau. These projects in FY 1989 included:

- Anacostia Museum. The OEC model shop made three patent models based on original patent drawings and three mannequins for the "The Real McCoy: African-American Invention and Innovation, 1619-1930" exhibition. OEC also edited the exhibit script as well as designed and edited the gallery brochure.
- National Museum of African Art. OEC designed the installation for the "Gold of Africa" exhibition.
- National Museum of American History. The OEC model shop created 20 lifelike mannequins for the "Men and Women: A History of Costume, Gender, and Power" exhibition. One challenge was to capture a sense of action in a figure posed riding a bicycle. Each mannequin has a face cast from life (most of the faces were cast from OEC staff volunteers).
- National Zoological Park. OEC's taxidermy specialist has been working on an unusual project for the Zoo's Conservation and Research Center. The Zoo has been breeding black-footed ferrets for reintroduction into the wild. Before they can be released, the ferrets have to learn to fear predators. To that end, OEC has mounted a taxidermied badger on a radio-controlled model truck chassis, which the Zoo will use to teach the ferrets to run from such predators. OEC has also designed a taxidermied owl posed in flight to teach the ferrets about winged predators.
- Reading Is Fundamental (RIF). The RIF program conducts an annual contest for which school children submit posters promoting reading. OEC matted and framed posters and produced labels and a text panel for the Smithsonian exhibition of winning entries.
- Resident Associate Program (RAP). OEC produced two exhibits for RAP. For "RAP Commissions Art," OEC framed original prints and produced text panels and labels. For "Discover Graphics," OEC matted and framed the works on paper and produced the exhibit text panel and labels.
- Smithsonian Institution Traveling Exhibition Service (SITES). In addition to the Volcano exhibit, OEC designed, edited, and produced 14 new exhibits for SITES. "Facing the Gods: Ritual Masks of the Himalayas" was complete with wall-hung and freestanding cases for 75 masks. Because the masks do not travel in their exhibit cases, each mask was permanently mounted on a

fabric-covered panel to limit direct handling during the tour and packed in custom shipping containers. OEC adapted "Badges of Pride: Symbols and Images of American Labor" from an exhibit at the Museum of American History. The touring exhibit included 30 interpretive text panels and about 75 artifacts. OEC designed, edited, produced, and crated this exhibition for SITES. OEC also designed, edited, and produced "Plains Indian Arts: Continuity and Change," an exhibit comparing 19th-century and contemporary Indian objects. Staff designed and fabricated custom brackets, mounts, and packing for each artifact.

- "Documents for Liberty: The Bicentennial of the French Revolution, 1789-1989." For this special project of the Office of the Assistant Secretary for Museums, OEC designed the display in the Arts and Industries Building for two French documents, including banners and a gallery brochure. OEC also adapted exhibit cases, built custom mounts for the documents, and silk-screened the text.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, OEC requests an increase of 4 workyears and \$212,000 to expand the exhibition production services it makes available to Smithsonian museums (2 workyears and \$106,000) and to manage exhibition spaces not attached to specific bureaus (2 workyears and \$106,000).

Expansion of Exhibition Production Services (2 workyears and \$106,000)- Expanding the Smithsonian's exhibition design and production resources will benefit the public and the Institution. With additional staff, OEC can design and produce exhibitions for Smithsonian museums for less than the cost of outside contractors. In addition, OEC's expanded exhibition capability will strengthen its ability to support SITES' effort to provide more Smithsonian traveling exhibitions to smaller organizations that serve economically disadvantaged areas.

When OEC is forced to turn down a request due to lack of staff, either the project fails to proceed according to schedule, thereby increasing the cost, or the project goes to more expensive outside contractors, an alternative that also increases the cost. The number of project requests to OEC will increase for several reasons. First, a 1988 study by the Smithsonian's Office of Management Analysis (MAO) has shown that exhibitions produced by OEC are significantly less expensive than those produced by outside contractors. As a result, bureaus are turning to OEC for exhibit work more frequently. Specifically, SITES plans to increase the number of its reasonably priced exhibitions for small and medium-sized museums and historical organizations. Better service to these organizations is important to the Institution's goals of reaching more culturally, ethnically, and economically diverse audiences. In order to keep the production costs (and, therefore, the participation fees) down, SITES will rely more heavily on OEC's services. In addition, several new and active exhibition spaces, such as the International Gallery in the S. Dillon Ripley Center, Baldrige Hall in the Department of Commerce Building, and the Experimental Gallery in the Arts and Industries Building, will depend on OEC for most exhibition services.

The requested resources will enable OEC to hire two new staff members. An exhibit specialist (1 workyear and \$32,000) will prepare labels and text panels, mount photographs, and frame art work. A writer-editor (1 workyear and \$32,000) will work on labels, texts, and brochures, do proofreading, and specify typography. Support costs (\$42,000) for these positions include a computer for the writer-editor and other necessary supplies and equipment.

Both positions will allow OEC to respond to greater needs and contribute to greater cost-efficiency throughout the Institution.

Gallery Management (2 workyears and \$106,000) - To better serve the public and international sponsors, OEC will undertake coordination of Smithsonian exhibition spaces currently not administered by a Smithsonian museum.

In an effort to expand the total number of exhibit spaces within the Institution, the Smithsonian has recently established several pan-Institutional exhibit galleries outside the responsibility of individual museums. For example, the International Gallery in the S. Dillon Ripley Center has increased pan-Institutional exhibition space for major shows presented on international themes. In addition, the office of the Assistant Secretary for Museums is negotiating with the Department of Commerce to place exhibits in Baldrige Hall, at the north end of the Department of Commerce Building. Like the International Gallery, its use would be pan-Institutional. Finally, a new Experimental Gallery in the Arts and Industries Building will open to the public in FY 1991. This Gallery, administered by the Office of the Assistant Secretary for Museums, will test new techniques for presenting information and museum collections to various types of audiences. The Experimental Gallery will feature four exhibitions annually, two developed by museums outside the Smithsonian and two by selected teams of Smithsonian specialists.

OEC will assume oversight of these and other unassigned exhibit spaces, managing day-to-day operations and providing exhibition-related services. The requested increase will allow OEC to hire a gallery director (1 workyear and \$35,000) and an assistant (1 workyear and \$24,000). Together they will devise a system for selecting exhibitions for unassigned spaces, coordinate installation and dismantling, supervise contracts, prepare budgets, participate in fundraising, coordinate security and housekeeping services, coordinate publicity, and develop appropriate public programming for each exhibition. Support costs (\$47,000) for these positions will provide necessary office space and supplies.

Additional staff at OEC will enable the Institution to provide support for gallery spaces that are pan-Institutional and will primarily benefit the public who come for the enrichment of the many disciplines presented through exhibitions.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Proceeds from the sale of the OEC book A Freeze-Dry Manual through the Smithsonian Institution Press and reimbursements from internal Smithsonian units provide these funds. OEC uses the funds to purchase supplies, materials, and services in support of OEC activities; to defray costs associated with special events; and to supplement travel expenses.

SMITHSONIAN INSTITUTION TRAVELING EXHIBITION SERVICE

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	15	688	8	314	24	1,560	-	629	-	9
FY 1990 Estimate	15	708	8	314	24	1,835	-	518	-	10
FY 1991 Estimate	39	2,108	8	374	-	1,543	-	449	-	4

* FTE - Full-time equivalent

**FTP - Full-time permanent

ABSTRACT - The Smithsonian Institution Traveling Exhibition Service (SITES) offers carefully selected traveling exhibitions that draw upon the collections of the Smithsonian, United States and foreign museums, foreign governments, private individuals, and organizations throughout the world. The largest service of its kind in the United States, SITES provides a broad selection of exhibitions encompassing the diverse disciplines and subject matter represented at the Smithsonian, including the arts, natural history, design, archeology, anthropology, science and technology, decorative arts and crafts, and popular culture.

In FY 1991, SITES intends to increase the availability of its programs among American audiences that previously have not been able to benefit from the Smithsonian's presence beyond the Mall. Included in this challenge is a commitment to develop exhibitions especially for smaller, budget-limited museums, many of them in non-urban areas, and for schools, university galleries, libraries, and community centers. Diverse minority audiences are also intended beneficiaries of this initiative, for many of the Nation's ethnic groups are unaffiliated with the institutions SITES traditionally has served. To bring the Smithsonian to these new places and groups, however, SITES must be able to offer high-quality exhibitions at affordable rates.

For FY 1991, SITES requests an increase of 24 workyears and \$1,400,000 to enable it to develop more affordable exhibitions by reducing the participation fees it must charge exhibitors.

PROGRAM - SITES is a high-visibility outreach arm of the Smithsonian. Its exhibitions reach an estimated 11 million people every year. Host museums and educational institutions in the United States and abroad book SITES programs for periods of four to eight weeks by paying a preestablished rental fee as well as one-way shipping costs and insurance. Every SITES exhibition includes curatorial and registrarial information, handling and installation instructions, publicity materials, publications, and recommended educational activities and public programs.

SITES' primary commitment is to the circulation of Smithsonian-based exhibitions and research. In FY 1991, SITES' program will include a National Zoo exhibition about human perceptions of and attitudes toward animals; two Anacostia Museum exhibitions, one on black churches in America and another on African-American invention; a National Museum of American History exhibition on the relationship between fashion, gender, and social roles; a National Air and Space Museum exhibition about space transportation technology; a traveling version of the National Museum of Natural History's Columbus Quincentenary exhibition, "Seeds of Change"; a National Portrait Gallery exhibition surveying the work of Winold Reiss; a Sackler Gallery exhibition by one of India's leading photojournalists; and two exhibitions based on the Office of Folklife Programs' activities with family farms and groups in urban Philadelphia.

Still other SITES programs originate at non-Smithsonian museums or with private collectors. Projects from outside the Smithsonian are accepted into SITES' schedule after being reviewed by staff teams, which evaluate proposals based on the needs and interests expressed by exhibitors in the field and on the availability of collections not represented by the Smithsonian's holdings. In FY 1991, such programs will include an international loan exhibition from the Soviet Union entitled "Moscow: Treasures and Traditions"; an exhibition cosponsored with the National Geographic Society that addresses geographic illiteracy; an exhibition about global change; an exhibition entitled "Contrasts," which looks at the impact of industrialization on centuries-old traditions in Puerto Rico; and "Coming of Age in America," an exhibition on the aspirations and realities faced by the Nation's ever-growing elderly populations.

At any given time, more than 120 SITES exhibitions are in circulation around the country or globe or in some stage of planning and production. Annually, the number of new exhibitions fluctuates between 25 and 30. Smithsonian magazine, by publicizing the locations of certain SITES shows in each issue, helps to increase SITES' national audience. SITES also markets exhibitions directly to some 9,000 institutions and individuals through Update, its annual catalogue of available exhibitions, and through a quarterly newsletter called Siteline.

During FY 1989, 92 SITES exhibitions traveled in the United States to 200 cities in 45 states and the District of Columbia. Total exhibition bookings came to 330, including three bookings outside the United States.

Alabama 5	Mississippi 4
Alaska 3	Missouri 8
Arizona 1	Montana 7
Arkansas 3	Nebraska 2
California 14	Nevada 3
Colorado 10	New Hampshire 1
Connecticut 9	New Jersey 4
District of Columbia 5	New Mexico 3
Florida 20	New York 20
Georgia 12	North Carolina 9
Hawaii 2	Ohio 23
Idaho 2	Oklahoma 5
Illinois 2	Oregon 3
Indiana 8	Pennsylvania 11
Iowa 7	Rhode Island 3
Kansas 6	South Carolina 5
Kentucky 8	South Dakota 1

Louisiana 1	Tennessee 12
Maine 1	Utah 2
Maryland 6	Virginia 6
Massachusetts 12	Washington 6
Michigan 16	West Virginia 5
Minnesota 4	Wisconsin 8

These numbers do not total 330 because some exhibitions were double-booked for extended showings in particular cities.

SITES also maintains an international program, sharing collections from the Smithsonian and other sources in addition to exhibition expertise with people outside the United States. In FY 1989, two SITES exhibitions traveled to Canada: "Child to Child: American-Soviet Children's Art Exchange" and "Art of Botany." "Power and Gold: Jewelry from Indonesia, Malaysia, and the Philippines" toured Hong Kong and Taipei, Taiwan.

Apart from its exhibition services, SITES regularly advises colleagues at other museums on professional topics such as shipping and insuring artifacts, developing public programs, and handling exhibit installation, security, design, and contract matters. Often these issues are covered in SITES' Workshop Program, which brings together representatives from institutions slated to host SITES exhibitions. Museum professionals with similar concerns thus have an opportunity to pool their resources and share program ideas, technical information, and presentation strategies that heighten audience interest and involvement.

To expand its service capabilities, SITES has initiated a program to underwrite exhibition tours with State Humanities Councils. SITES' activities in New Mexico set the model for this partnership. There, the State Council agreed to fund participation and shipping fees for a group of host museums willing to book SITES exhibitions consecutively. Institutions throughout New Mexico that independently could not have afforded a SITES program thus not only scheduled a show but also created accompanying public programs by pooling their limited funds.

Diverse segments of the American public continue to have limited formal relationships with the Smithsonian. Through this program increase, the Federal government will bolster the Institution's role as a national educational resource. Exhibitions convey new information and ideas. They teach and enlighten. SITES hopes that its FY 1991 program emphasis will enable audiences of all ages and backgrounds to reap the benefits of the Smithsonian's exhibition offerings.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, SITES requests an increase of 24 workyears and \$1,400,000 to enable it to develop more affordable exhibitions by reducing the participation fees it must charge exhibitors. OMB and Congress long have recognized SITES' unique ability to extend the Smithsonian's resources to public audiences nationwide. Over the years, millions of people have visited SITES exhibitions in their local communities, creating a special relationship between the Smithsonian and those who cannot visit the Mall firsthand. Because SITES' operating expenses are subject to cost recovery, however, many museums and educational institutions still cannot afford to participate in the Smithsonian's outreach efforts. The requested funds will enable SITES to reduce exhibition participation fees and in turn respond to the program needs and financial realities of resource-poor institutions.

At present, SITES' total operating budget consists of two general categories: direct subsidies and recoverable costs. Direct subsidies involve nonreimbursable expenses from three funding sources: Federal appropriations, nonappropriated Smithsonian Trust fund support, and outside grants and contracts. SITES must recover all remaining operating costs through participation (rental) fees charged to exhibitors.

A program increase of \$1,400,000 will enable SITES to plan and develop exhibitions relevant to culturally and ethnically diverse audiences at reasonable fees. Creating more affordable exhibitions by reducing participation fees is the primary goal. The requested funds will pay for the 24 workyears whose cost SITES now must recover from exhibitors. The funds also will support exhibitions of interest to minority and other underserved audiences.

The requested funds will cover the salary costs of exhibition coordinators (9 workyears and \$414,000), project team supervisors (4 workyears and \$220,000), a cultural affairs monitor (1 workyear and \$46,000), a scheduling coordinator (1 workyear and \$46,000), a public affairs officer (1 workyear and \$55,000), registration assistants (2 workyears and \$52,000), a clerk-typist (1 workyear and \$22,000), a registrar (1 workyear and \$38,000), an assistant editor (1 workyear and \$32,000), a publications officer (1 workyear and \$55,000), a publications/marketing assistant (1 workyear and \$26,000), and a proposal writer (1 workyear and \$46,000). The total personnel costs of these positions are 24 workyears and \$1,052,000.

The remaining funds will pay travel expenses for SITES technicians who provide on-site advice on climate control, security, and storage of exhibitions, and who assist with installing exhibitions at smaller institutions that do not have the expertise or resources necessary to mount exhibitions independently (\$58,000); subsidize shipping for institutions that cannot afford rapidly escalating transportation costs (\$80,000); pay printing and reproduction costs for educational brochures (\$30,000); pay for office and construction supplies (\$30,000); and pay for other services, notably production costs to the Smithsonian's Office of Exhibits Central and outside contractors for constructing, packing, crating, and framing exhibitions, and for curatorial and educational experts who serve as advisors for SITES exhibitions (\$150,000).

SITES brings the Smithsonian to millions of visitors beyond the Nation's capital. By requesting this program increase, SITES hopes to ensure that each of these visitors benefit fully and directly from the Institution's program services.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - The bulk of SITES' operating budget comes from participation fees collected from museums and other recipients of traveling exhibitions. These funds, supplemented by an allotment, support exhibition development costs including salaries and benefits, exhibition production, publications, materials, outside specialists, and contractual services. The Smithsonian also supports certain SITES exhibitions on a selective basis with monies from the Special Exhibition Fund.

Restricted Funds - Individuals, organizations, and corporations donate gifts and foundation grants for specific SITES projects. During FY 1989, SITES received grants from the Boeing Company and the Goodwill Games for "Moscow: Treasures and Traditions"; from King Features for "Great American Comics"; from the MacArthur Foundation for a

Spanish-language version of "Tropical Rainforests: A Disappearing Treasure"; from MCI Communications Corporation for "Inside Active Volcanoes: Kilauea and Mount St. Helens"; and from the American Association of Retired Persons for "Coming of Age in America."

Government Grants and Contracts - Various levels of government provide funds for support of specific exhibitions. A contract with the U.S. Fish and Wildlife Service, for example, recently enabled SITES to circulate a National Museum of American History exhibition about duck stamps, entitled "The Legacy Endures."

MUSEUM SUPPORT CENTER

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	41	4,419	-	-	-	-	-	-	-	-
FY 1990 Estimate	42	4,491	-	-	-	-	-	-	-	-
FY 1991 Estimate	88	11,197	-	-	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Museum Support Center (MSC), located in Suitland, Maryland, adjacent to the Institution's Suitland Facility, provides a state-of-the-art facility for the care, conservation, and storage of the Institution's collections. The conservation facilities at the MSC include the Conservation Analytical Laboratory and conservation laboratories for the National Museum of Natural History/Museum of Man and the National Museum of American History. The collections storage area at the MSC occupies four discrete sections (or pods) and provides three types of storage space: collections storage in cabinets; "wet" collections storage on open shelving for biological specimens in alcohol; and "high-bay" storage for very large objects. (For FY 1990 and prior years, the Museum Support Center budget line-item appeared in the Special Programs section.)

For FY 1991, the Institution requests total funding of 88 workyears and \$11.197 million for the Museum Support Center, including the purchase of collection storage cabinets and components (\$8.0 million); the preparation and transfer of collections to the MSC (45 workyears and \$1.79 million); the completion of a program to evaluate the effectiveness of asbestos decontamination techniques as applied to museum objects prior to their move to the MSC (6 workyears and \$110,000); and the ongoing administration, information management, and building management services at the MSC (37 workyears and \$1.297 million). Beginning in FY 1991, the Institution requests that funding for MSC collections storage equipment and for MSC Move costs be available until expended (for FY 1991, this sum equals \$9.79 million of this request).

The FY 1991 request for the Museum Support Center includes the following increases above the FY 1990 level: an increase of \$4.942 million for MSC collections storage equipment (over the FY 1990 base of \$3.058 million); an increase of 34 workyears and \$1.504 million for MSC Move costs (over the FY 1990 base of \$286,000); and an increase of 1 workyear and \$260,000 for MSC operations (over the FY 1990 base of 36 workyears and \$1.037 million). In addition, the Institution requests an additional 11 workyears associated with base funding used for the personnel costs of temporary on-board positions for the Move.

PROGRAM - The Institution's Museum Support Center provides state-of-the-art facilities for the storage of museum collections; the conservation and preservation of museum objects; and conservation training. The unique design of the MSC creates two wings (a laboratory and a storage wing) on either side of a central corridor. Conservation facilities occupy a significant portion of the laboratory wing, and their activities include conservation treatment, scientific analysis, and training. The Conservation Analytical Laboratory (CAL), the Anthropology Conservation Laboratory of the National Museum of Natural History (NMNH), and some of the facilities of the Division of Conservation of the National Museum of American History (NMAH) are at the MSC. The Museum Support Center branch of the Smithsonian Institution Libraries, one of six conservation libraries in the world and one of only two in this country that provides a reference service on conservation, maintains a collection of more than 15,000 books and 180 periodical titles.

The Smithsonian Oceanographic Sorting Center, a specialized research and service unit of the National Museum of Natural History, also occupies space in the laboratory wing. The Sorting Center sorts and classifies animals and plants which oceanographic expeditions collect, and then distributes these specimens to scientists around the world.

During FY 1988, the National Museum of Natural History established a new Laboratory for Molecular Systematics at the Museum Support Center. This laboratory builds upon the Museum's broad expertise in systematic and evolutionary biology and incorporates historical and ecological perspectives. It will enable molecular study of the genetics of organisms by the largest single team of systematic biologists in the world. The laboratory will focus on DNA molecular analysis.

The storage wing consists of four storage pods, each approximately the size of a football field and 28 feet high. Collections stored in cabinets on three levels of concrete decks will occupy approximately five-eighths of the total storage space (Pods 1 and 2, and a portion of Pod 4). In addition, Pod 3 provides open shelving for storing "wet" collections (those in alcohol), and a portion of Pod 4 will allow "high-bay" storage of very large objects.

The move of millions of objects and specimens to the Museum Support Center is unprecedented in the museum world. The volume, characteristics, and variety of the collections and the distance of the transfer pose special challenges. Since FY 1983, the Institution has prepared collections from NMNH and NMAH for the Move and begun the transfer of some of these collections to the MSC. The Smithsonian coordinates each phase of the move using an automated project management system for highly complex projects. This system provides management with automated information on relevant variables that affect the complex schedules, enabling management to update that information easily and quickly. In addition, the MSC Move staff determine the specific methods of packaging and modes of transport appropriate to the particular collections and objects involved. The Institution currently projects that the initial move efforts will continue at least through FY 1995.

Museum Support Center Collections Storage Equipment - Between FY 1981 and FY 1989, the Institution obligated over \$28 million to purchase and install collections storage equipment at the MSC. The contractor completed the installation of the "wet" storage equipment for the initial move in Pod 3 in 1983. Problems in the procurement of the storage equipment for the other pods resulted in several years of delay, but the Institution and the General Services Administration, acting as the

Smithsonian's agent, have made significant progress in the reprocurement of collections storage equipment for MSC during FY 1989.

GSA awarded the new contract for the general construction of the structural deck system, mechanical, electrical, and sprinkler systems on October 13, 1988 to the Grunley Construction Company, Inc. The new contractor resumed construction in Pod 1 on November 11, 1988, and the Smithsonian took occupancy of Pod 1 on June 19, 1989.

The Smithsonian phased the general construction work by pod to allow partial occupancy of each pod as soon as a sufficient number of cabinets are available for storing objects. The general contractor has begun construction in Pod 2 and plans to complete Pod 2 by October 31, 1989. The contractor has begun installing structural components in Pod 4 and expects to complete Pod 4 by February 28, 1990.

During FY 1989, GSA has also issued four of the anticipated eight bid solicitations for collection storage equipment. These four packages will provide the majority of the storage equipment required to relocate the initial move high density collections to MSC:

- Shelving Storage Cabinets: GSA awarded the contract for two sizes of shelving storage cabinets on February 6, 1989. Installation of shelving cabinets began on July 7, 1989.
- Drawer Cabinets: GSA awarded the contract for two sizes of drawer cabinets on March 9, 1989. Installation of drawer cabinets will begin in October 1989.
- Insect Cabinets: GSA awarded the contract for insect cabinets on June 9, 1989. Installation of insect cabinets will begin in November 1989.
- Botany Cabinets: GSA awarded the contract for botany cabinets on June 13, 1989. Installation of botany cabinets will begin in February 1990.

GSA plans to solicit the bids for the final four collections storage equipment--for 96- by 50-inch large drawer and shelving cabinets, cantilever shelving units, compactor screens, and specialized fencing storage units--by the end of calendar year 1989. GSA anticipates the final completion of manufacture and installation of all storage equipment packages by the end of December 1992.

GSA currently estimates the reprocurement costs for the construction of decking and utilities and for the manufacture and installation of Initial Move high-density storage equipment for Pods 1, 2, and 4 to be approximately \$27.7 million. Funding of \$24.6 million, which the Smithsonian has already transferred to GSA through FY 1989, is available for the reprocurement. The Institution has requested the balance of \$3.058 million needed for the reprocurement as part of its FY 1990 budget. At the present time, unit price costs for four types of storage equipment are firm, excluding escalation; four are still estimates. Under the terms of the contracts, GSA has built in annual escalation costs for equipment not installed within one year after contract award, limited to an annual maximum increase of ten percent of the Producer Price Index for filing cabinets and cases and of ten percent of the Engineering News Record Skilled Labor Index for freight and installation.

Move of the Collections to the Museum Support Center - Between FY 1983 and FY 1988, the Institution spent approximately \$2.6 million to prepare the collections

for relocation, to move collections for which there is storage equipment, and to cover the salary costs of the temporary work force engaged in cleaning, packing, and moving collections. During FY 1989 and FY 1990, the Institution will continue this process with funding of \$267,000 provided for FY 1989 and \$286,000 requested for FY 1990.

The Smithsonian completed the initial move of over 260,000 specimen lots into the "wet" collection storage equipment in Pod 3 in 1985. Since that time, the MSC Move staff has transferred in excess of 53,700 additional specimen lots to Pod 3.

While problems in procuring the storage equipment for the Initial Move into Pods 1, 2, and 4 have delayed the permanent relocation of other collections to the MSC, the Institution has continued to prepare collections and to move selected ones to temporary storage locations at the MSC until their permanent storage space becomes available. These collections include:

- more than 197,500 archeological objects (representing 25 percent of those collections) and 17,500 ethnological objects from the Department of Anthropology;
- more than 4,198,000 insect specimens from the Department of Entomology;
- more than 36,700 petrology and meteorite specimens from the Department of Mineral Sciences;
- more than 3,000,000 specimens from the Department of Paleobiology;
- 204,500 specimens from the Department of Botany, including diatoms and algae;
- 27,500 specimens from the Department of Invertebrate Zoology.

The MSC Move staff has inspected these objects for pests and conservation problems and has properly stabilized these collections. The collections relocated to MSC are in less-crowded and better-controlled conditions than collections stored in most other Smithsonian storage areas. As a result, they have far greater potential for long-term preservation and use.

In FY 1989, the staff cleaned, prepared, and packed 1,500 toys from the Museum of American History. These specimens are in temporary storage at the Garber Facility until storage equipment is available at MSC. Staff also continued to move collections from the Departments of Botany, Entomology, Invertebrate and Vertebrate Zoology to temporary MSC storage locations.

The MSC Move's current priority is to update and refine plans for relocating collections to permanent MSC storage locations in FY 1991. Based on the planned delivery schedules for reprocurd storage equipment, the Institution has proposed a new schedule for moving the collections of the Museum of Natural History and the Museum of American History to ensure that the Move is accomplished in a timely and effective manner. Coordinating this complex project requires considerable advance planning. For example, the MSC Move administration will continue to refine the automated Move schedule so that when intense activity begins in FY 1991, the Move will be accomplished efficiently. Also during FY 1990, the Move staff anticipates completing the development of another automated system that will determine the best

spatial arrangement within the storage equipment of the two million anthropological objects that will be stored in Pods 1 and 2.

The Move technicians will continue in FY 1990 to prepare and pack collections from the Museum of American History and will store them temporarily at the Suitland Facility. The MSC Move will hire conservators to determine appropriate supplies and methods for stabilizing and packing the collections. Later in FY 1990, the Move staff will begin to prepare and pack the collections of other departments. These collections will remain in the buildings currently storing them until sufficient permanent storage equipment is ready at MSC in early FY 1991.

Asbestos Decontamination Techniques - With funding provided in FY 1989, the Institution began evaluating the effectiveness of various asbestos decontamination techniques to clean museum objects prior to moving them to the Museum Support Center. Decontamination is necessary because asbestos has contaminated these objects' present collections storage areas in the National Museum of Natural History, the National Museum of American History, and the Suitland Facility. An evaluation of various techniques will ensure that staff and contractors have cleaned the collections effectively and that the collections pose no health threat to researchers or the public when the specimens are examined or displayed. The evaluation uses surface-testing and air-monitoring methods to indicate the level of contamination, both before and after cleaning. The Institution anticipates that it will complete this program in FY 1991.

Administration and Facility Management - The Office of the Director of the Museum Support Center coordinates activities of the various user and support units; oversees the automated data processing center used for registration and collections management activities, including the Move to the MSC; and arranges services to meet the research and informational requirements of MSC occupants. The Office also oversees the procedures established to control and account for the flow of collections into and out of the MSC and ensures the safety of the collections against pest infections and other hazards. Under the general supervision of the MSC's Office of the Director, the facility manager is responsible for providing shipping and receiving services, moving equipment and objects, overseeing safety and security operations, and cleaning and maintaining all aspects of the building. Because of the need to maintain very strict environmental standards for the care and storage of museum objects, cleanliness is a fundamental requirement for the successful operation of a collection management facility.

EXPLANATION OF PROGRAM INCREASE: The FY 1991 request for the Museum Support Center includes the following increases above the FY 1990 level: an increase of \$4.942 million for MSC collections storage equipment (over the FY 1990 base of \$3.058 million); an increase of 34 workyears and \$1.504 million for MSC Move costs (over the FY 1990 base of \$286,000); and an increase of 1 workyear and \$260,000 for MSC operations (over the FY 1990 base of 36 workyears and \$1.037 million). In addition, the Institution requests an additional 11 workyears associated with base funding used for the personnel costs of temporary on-board positions for the Move.

Museum Support Center Collections Storage Equipment (\$4.942 million) - For the period from FY 1991 through FY 1994, the Institution requests a level of funding of \$8.0 million each year to purchase collections storage equipment for the MSC. This level of funding, representing an increase of \$4.942 million over the FY 1990 base, will allow the Institution to purchase (1) the "high-bay" storage equipment for Pod 4;

(2) the balance of the "wet" storage equipment for Pod 3; and (3) the balance of the collections storage cabinets for Pods 1, 2, and 4.

"High-Bay" Collections Storage Equipment: The Smithsonian deferred the purchase of the "high-bay" storage equipment for several years in order to complete the procurement of the high-density storage equipment for the Initial Move. In FY 1991, the Institution will design the "high-bay" system, which will store such items as totem poles, whale skeletons, rickshaws, weaving looms, and furniture. This storage equipment will consist of industrial cantilever shelving racks approximately 24 feet high; the necessary mechanical, electrical, and plumbing systems; and material handling equipment to access these collections. Both NMNH and NMAH need this kind of storage equipment.

Following the preparation of the final design of the system, the Smithsonian will contract for the components of the "high-bay" system and its installation. The current preliminary cost estimate of the final design and installation of the "high-bay" storage system, including escalation to FY 1991 price levels, exceeds \$2.0 million. This funding level is based on the estimated cost of this equipment in FY 1985, adjusted for escalation. The Institution will refine this cost estimate once the final design is complete. Actual cost for the "high-bay" storage equipment may vary as the result of actual bids received at the time of procurement and the effective inflation rate for the city of the bidder during bid submission.

"Wet" Collections Storage Equipment: The Smithsonian completed the initial move of "wet" collections in 1985. Within the next five years, the Institution plans to purchase additional "wet" storage equipment to occupy the balance of the "growth" storage areas of Pod 3. The installation of the additional "wet" storage system will require metal columns, catwalks, and all utilities for the three-level, self-supporting structure of open shelving. The first phase of this work will require the services of an architectural/engineering firm to provide a design and firm procurement cost estimate.

The present preliminary estimate for completing the growth storage equipment in Pod 3 ranges from \$6.1 to \$8 million. The \$6.1 million estimate is based on the cost data for the design, management and inspection, and construction costs of the first part of the "wet" storage system installed in 1983, adjusted to include inflation at the rate of six percent per annum. The \$8 million estimate also takes into account that the storage equipment for the growth areas in Pod 3 will be more complicated than the original equipment, resulting in higher costs. Following the design work of an architectural/engineering firm, the Institution can provide a more accurate estimate of total cost, including an appropriate cost for inflation.

Purchase of Collections Storage Cabinets: After the completion of concrete decks in Pods 2 and 4, the Institution will begin to purchase and install storage equipment for the growth areas in these two pods. At this time, the Institution cannot determine the specific number of the different types of cabinets, drawers, and other equipment that it will require, as well as the specific timetable for the installation of the "growth" storage equipment. The Institution currently anticipates, however, that the purchase and installation of this storage equipment could begin as early as FY 1991.

Preliminary cost estimates for the procurement of collection storage equipment for the high-density growth areas in Pods 2 and 4 total as much as \$11.2 million, without taking escalation into account. According to some of the cabinet

manufacturers, escalation over the period of one year can be as high as 15 percent for the cabinets alone. Escalation on the freight charges and the installation costs for the storage equipment will further increase these costs. In an effort to reduce these costs, GSA has written the current collection storage equipment solicitations and contracts for the Initial Move to permit it to procure many, if not all, of the cabinets for growth space in Pods 2 and 4, on these same contracts. These contracts provide for unit price costs for cabinets, shelves, drawers, and independent cabinet bases, as well as unit prices for freight and installation. As indicated previously, these contracts also provide for annual escalation, limited to a maximum of ten percent, based on a producer price index for the cabinet components, and based on the Engineering News Record Skilled Labor Index for freight and installation. These provisions will be in effect for a period of five years, beginning in calendar year 1989.

In addition to the purchase of cabinets for the growth space, the Institution eventually will need new steel cabinets to replace a large number of existing wood frame cabinets and drawers from the Museum of Natural History that it is relocating to the MSC as part of the Initial Move. The new cabinets, which will be six inches deeper than the existing cabinets, will permit the Smithsonian to make more efficient usage of the available storage space at the MSC. Moreover, since the acid in the wood frame cabinets is deleterious to many of the objects stored in them, replacement with new metal cabinets will provide a better long-term storage environment. Cost estimates for this replacement total as much as \$4.8 million without taking escalation into account.

In summary, the Institution estimates that the procurement of new cabinets for growth high-density areas and the replacement of the existing wood frame cabinets will require as much as \$16 million (in 1989 dollars), without taking escalation into account. Assuming escalation calculated at ten percent per year and procurement of these cabinets in FY 1991 and FY 1993, the cost to complete the high-density storage equipment (after the Initial Move) would total \$22.4 million. Two factors which may cause this preliminary cost estimate to fluctuate are: (1) inflation; and (2) the actual numbers and types of cabinets, shelves, and drawers procured, if they differ from the ones predicted in the preliminary cost estimates, since they are based on the Initial Move procurements.

Need for No-Year Funding for MSC Storage Equipment: The Smithsonian requests no-year funding for the design, procurement, and installation of collections storage equipment for MSC. No-year funding will permit flexibility in the procurement of the remaining storage equipment, especially for "high-bay" storage in Pod 4 and the "wet" storage equipment in Pod 3. Because of the time required to bid and award contracts for major projects such as the MSC storage equipment systems, the procurement process may exceed the period of availability of funds in a one-year appropriation.

After the Smithsonian receives its appropriation, it must prepare and issue a design specification and allow time for potential contractors to submit bids. The Institution must then review and evaluate these bids and award the design contract. Document preparation takes time, then design takes several months, following which the Institution prepares the designer's documents for the storage equipment as solicitation documents to procure the system. The Smithsonian must then allow for appropriate bidding time, which can take several months, depending on the system being procured.

The Institution reviews and evaluates these bids and awards the procurement contract. The labor-intensive and time-consuming nature of this process makes it extremely difficult to obligate funding within a single fiscal year. The provision of no-year funding for the storage equipment project will allow the design, procurement, construction, and installation processes to proceed smoothly without the pressures of hasty year-end obligations to avoid the loss of funding. In addition, no-year funding will permit the most efficient and cost-effective use of funding for procuring of all four remaining phases of storage equipment at MSC. Portions or all of each phase will then be procured when needed.

Move of the Collections to the Museum Support Center (34 workyears and \$1.504 million) - In FY 1991, the Institution anticipates a major increase in MSC move activity since a large amount of Initial Move storage equipment of various sizes and types will be in place by then. The Institution will need to hire additional museum specialists and technicians to expand present Move activity, as well as conservators to develop handling and packaging procedures and train the Move staff to use them. The Institution may contract some work, such as conservation and asbestos decontamination, to outside firms. The administrative staff will also procure the necessary supplies and equipment, coordinate the logistics, continue the planning, monitor the progress of the Move against the proposed schedule, and revise the schedule as necessary. The specialists and technicians will inspect, clean, create automated invoices, stabilize, pack, transport, unpack, and place collections into permanent storage equipment at the MSC.

The initial focus of the Move in FY 1991 will be on high priority collections and collections that will take a long time to move, including the Museum of American History and the Museum of Natural History's Departments of Anthropology, Vertebrate Zoology, and Entomology. Over time, the Institution will move collections from all divisions from the seven departments of the Museum of Natural History and the two departments of the Museum of American History. In addition, at the appropriate time, those collections already in temporary storage at the MSC will be relocated into their permanent storage equipment. The Institution will also relocate thousands of existing collection storage cabinets from the Museum of Natural History to the MSC for storing collections of the Departments of Mineral Sciences, Invertebrate Zoology, and Paleobiology.

The increased move activity will require a substantial increase of funding over the FY 1990 base to achieve this plan. First, because the delay in installing the collection storage equipment has postponed the Move so long, the museums scheduled to move collections into MSC are desperate for the proper storage for their collections and for the space relief that the relocation will provide. Second, the Smithsonian needs to reduce the time spent on the Move in order to reduce its total cost because the longer the Move lasts, the more it will cost as a result of inflation. Third, as detailed below, the Institution must delay other major projects if the Move does not occur quickly.

Collections relocated to the MSC will be more accessible to researchers and better preserved for future generations of museum visitors, educators, and researchers because of the improved environmental and storage conditions at MSC as well as the care the collections will receive during preparation for the Move, including cleaning and stabilizing specimens by Move personnel. For example, among the collections needing relocation are the native-American ethnological objects currently stored in one of the Natural History Building's attics which has exposed asbestos insulation.

Support for the Move will allow the collections to survive for research, educational outreach, and appreciation by future generations. Many specimens in the collections represent species at risk of extinction by man's continued impact on the planet. With the destruction of certain ecosystems, these specimens will become increasingly important for the study of pollution effects and the physical destruction of the earth's environments. Some collections, including tropical plant and mammal specimens, are in immediate danger of complete deterioration in the poor environmental conditions at the Suitland Facility and the Smithsonian Institution Service Center at 1111 North Capitol Street. These collections will also be relocated to the MSC.

The three years from FY 1991 through FY 1993 are the most critical years for the Initial Move. For example, the curatorial departments which are moving smaller numbers of collections will relocate their Initial Move specimens during this three-year period, while the move of much larger collections, such as Anthropology, will begin during this period and continue through FY 1995. The Institution projects the entire Move to last through 1995. The Smithsonian projects that the preliminary estimate for the MSC Move from FY 1991 through FY 1995 will total \$4.8 million. In order to bring this project to a timely and successful conclusion, the Institution will reevaluate and refine these cost estimates as the project proceeds and more information becomes available. The MSC Move administration expects FY 1991 to be the year in which the greatest resources will be necessary, both in terms of funding levels and number of temporary position.

Because the Institution is currently storing many of the collections in areas contaminated by asbestos, a special responsibility of the Move process is to decontaminate these collections prior to the Move. After establishing acceptable asbestos decontamination techniques, the Smithsonian will contract for specialized services to clean the objects. The \$4.8 million cost estimate includes the cost of these contracts.

As the Institution completes construction of its collections storage areas and installs its storage equipment, the Move will relocate millions of collections from the overcrowded storage areas on the Mall. This relocation will eventually free up some exhibit halls which museums are presently using for collections management and research purposes and are thus closed to the public. Relocating these collections from exhibit halls now occupied by collections management and research activities will permit the museums to return some of these exhibit galleries on the Mall to public use. Plans for gallery renovation are underway.

During the delays in procuring the storage equipment for the Initial Move, the collections of the curatorial departments have continued to grow. As a result, the distinction between those collections and activities designated for the Initial Move and those collections targeted for the future Growth Move has blurred. The Institution may need to conduct some Growth Move activity prior to completing the Initial Move activity. The Institution expects to require additional funding for Growth Move activities before FY 1995. To date, the Smithsonian has focused on the Initial Move into the high-density storage equipment. In the near future, the Institution will explore the needs for the Growth Move activities in more detail.

Need for No-Year Funding for MSC Move: The MSC Move is very labor intensive. Any changes in the schedule of purchase and installation of the collections storage equipment, any delays as a result of hiring or losing staff, or any other unanticipated event can produce significant changes in the proposed Move schedule. The Smithsonian requests the provision of no-year funding for the MSC Move to allow

shifts in the peak activity between fiscal years, without end-of-year restrictions resulting in the loss of appropriated funding. This provision will increase the overall efficiency of the Move, will ensure that sufficient Move funds remain available if there are changes in the schedule, and will provide the most cost-effective way to accomplish this project.

Administration and Facility Management (1 workyear and \$260,000) - As custodian of the National Collections, the Smithsonian possesses more than 134 million art objects, natural history specimens, and artifacts. With the responsibility for preserving these collections for future generations of scholars and visitors, the Institution pays careful attention to the acquisition, conservation, and storage of these objects. With the additional responsibility for researching and understanding the immense cultural and scientific heritage inherent in these collections, the Institution provides laboratory and support services for the world's leading students and scholars to study them. A critical factor in ensuring the preservation and study of the National Collections is the development of facilities, such as the Museum Support Center, that provide the optimum conditions for collections storage, research, and conservation. The Museum Support Center maintains the highest levels of building management and support activities, including computer services.

The Office of the Director of the MSC provides the infrastructure support services required for the care, conservation, storage, and move of the collections at the MSC. Its Office of Information Management provides computer services to staff throughout the Institution. The MSC's VAX computer supports a variety of Institutional systems devoted to research, collections management, communications, and other administrative functions. Of particular significance is the MSC Move invoice system, which controls the Initial Move of more than 36 million objects and specimens into the MSC.

As more personnel and collections relocate to the MSC, the level of support for management of the facility must increase to meet the expanding demand for these services. For FY 1991, the Office of the Director requests an additional computer specialist (1 workyear and \$45,000) to augment the existing two-person computer services staff to ensure uninterrupted service to users. Computer staff are responsible for the basic operation and maintenance of the VAX computer and software, for assisting users with problems and new applications, and for conducting research on new applications and technological opportunities. An efficient, well-trained computer services staff is essential for the cost-effective management of collections data and the increase and diffusion of new knowledge about the collections themselves.

The Institution depends upon modern, efficient computer technology. The MSC's VAX computer will be nearly ten years old in 1991, and by all standards will have exceeded its normal lifespan. Replacement is the most cost-effective and efficient solution to the problems of increased maintenance costs, decreased efficiency, and the inability to support newer applications. A new computer will also enable users to perform their tasks more effectively, whether their work is conservation, collections inventory, research, or budget administration. For FY 1991, the Institution requests one-time funding of \$215,000 to replace the VAX computer. This new computer is vital to the continuation and completion of the MSC Move.

In 1988, the Institution looked back at the accomplishments of MSC's first five years and looked forward to its full potential as a state-of-the-art facility for collections storage, conservation, and research. In the year since that anniversary, the MSC has seen the establishment of the new Laboratory for Molecular Systematics and

the installation of the first storage cabinets on the newly constructed third floor of the Pod 1 storage area. The MSC is rapidly achieving this potential, and the expanded level of computer support for automated information management will enable the Institution to better preserve the data and use of the National Collections for the benefit of both current and future generations.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - An allotment has supported the purchase of special laboratory equipment for the Conservation Analytical Laboratory.

PUBLIC SERVICE

ASSISTANT SECRETARY FOR PUBLIC SERVICE

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	23	1,298	44	2,713	-	167	-	33	-	-
FY 1990 Estimate	25	1,450	46	2,926	-	83	-	600	-	-
FY 1991 Estimate	31	1,895	46	2,959	-	69	-	1,000	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of the Assistant Secretary for Public Service encourages and supports the development of programs to advance the Institution's objectives in education, publication, information, electronic media, folklife programs, and the development of wider audiences. It advises the Secretary on general policy issues and program planning for Public Service activities. This line-item also includes the Office of Wider Audience Development, the Office of Telecommunications, the Visitor Information and Associates' Reception Center, and the Office of Public Affairs. The Office of Telecommunications produces programs for radio, film, and television relating to a variety of Smithsonian research and scholarly activities. The Visitor Information and Associates' Reception Center is a central support unit responsible for Institution-wide information and assistance programs for the public, Associate members, Smithsonian staff, and volunteers. The Office of Public Affairs acquaints the public with the programs and policies of the Institution by working with newspapers, magazines, television, and radio to gain media exposure for its exhibits, public events, and research.

For FY 1991, the Office of the Assistant Secretary for Public Service requests 6 workyears and \$445,000; for its immediate office, clerical support (2 workyears and \$53,000); for Telecommunications, clerical support (1 workyear and \$22,000); for Visitor Information and Associates' Reception Center, supervisory information receptionists (2 workyears and \$40,000), automated systems maintenance (\$40,000), increased printing costs (\$30,000); Office of Public Affairs, for clerical support (1 workyear and \$24,000), increased printing costs (\$50,000); and Columbus Quincentenary activities (\$36,000). An increase of \$100,000 justified in the Uncontrollable Increases section of this budget will support the Assistant Secretary's, Office of Public Affairs', and Telecommunications' payroll base deficiencies. The FY 1991 estimate also reflects an increase of \$50,000 justified in the Special Employment Initiatives and Ethnic Celebrations section of this budget to expand the Institution's outreach efforts to celebrate the achievements and contributions of women and the major ethnic minority groups.

PROGRAM:

I. The Office of the Assistant Secretary for Public Service - With base funding of 6 workyears and \$359,000, the Office of the Assistant Secretary for Public Service coordinates and supervises the Institution's general information and educational and public service programs and advises the Secretary on the development of policies and activities for these programs. The bureaus and offices reporting to the Assistant Secretary include the Office of Wider Audience Development, the Office of Telecommunications, the Visitor Information and Associates' Reception Center, the Office of Public Affairs, the Smithsonian Institution Press, Smithsonian magazine and Air and Space magazine, the Office of Folklife Programs, the Office of Interdisciplinary Studies, the Office of Elementary and Secondary Education, the National Science Resources Center, and the Office of Conference Services.

II. Office of Telecommunications - With base funding of 5 workyears and \$244,000, the Office of Telecommunications (OTC) produces programs for radio, film, and television relating to a variety of Smithsonian research, and scholarly activities. Distributed nationwide, these diverse programs are an important part of Smithsonian outreach, as they support and interpret the research, exhibition, and education goals of the Institution.

OTC produces two major program series. "Here at the Smithsonian," an award-winning series of short features for television, launched its eighth season with 17 new subscribing stations. It is telecast in seven of the ten largest cities across the country. "Radio Smithsonian," a weekly half-hour series, is carried by 90 stations nationally, reaching a potential weekly audience of four million people. Programs in both series focus on exhibitions, research, and performance activities throughout the Institution.

In FY 1989, OTC completed several other film and video projects. Two major video programs will premiere in the fall of 1989 in the Smithsonian Information Center in the Great Hall of the Castle. One element, a 20-minute orientation program, will run continuously in two identical theaters. The other component, an interactive video disc program, will help visitors effectively plan their time at the Smithsonian. Computer-based touch screens will provide information about each of the Institution's Washington museums and the National Zoological Park, along with details about visitor services, tours, demonstrations, and special attractions for children.

OTC will complete a major one-hour film titled The Earth in Our Hands, designed for television and educational distribution, in September 1989. The film shows how working models of entire ecosystems can provide a better understanding of our planet before modern civilization further depletes the diversity of life. Also, Robert Redford narrates a film based on the work of the Smithsonian's Marine Systems Laboratory, with an original score by Elmer Bernstein.

OTC also produced several new video programs for museum exhibitions. In the Hall of American Maritime Enterprise at the National Museum of American History (NMAH), nine short films will depict the role of towboats, the lifeblood of commerce on the Mississippi River and other inland waterways. The Office produced three audio-visual pieces for the NMAH exhibition, "Men and Women: A History of Costume, Gender, and Power." They reflect the cultural roles men and women have played in the Hollywood films of the 1920s, in television situation comedies of the 1950s, and in television advertising of the 1980s. "Moving America's Mail," produced for the National Philatelic Collection exhibition, tells the story of the mail truck through archival

footage and stills. Working with the NMAH Division of Musical History, the Office produced an interactive video to accompany an exhibition on the 90th anniversary of Duke Ellington's birth. The video features five of his film appearances spanning his career from 1929 to 1974.

For the Smithsonian Institution Traveling Exhibition Service (SITES), the Office is producing a ten-minute film to accompany an exhibition on Frank Lloyd Wright's decorative arts. The film explores the complex issues of preserving Wright's architectural legacy--both his buildings and his furnishings. The National Museum of American Art (NMAA) requested an interactive video disc to enrich a showing of the Patricia and Phillip Frost Collection. The program focuses on five artists who pursued abstract art in the 1930s and 1940s, a time when figurative art was much more popular.

During FY 1989, OTC provided administrative oversight for the Smithsonian Video Collection, a series of programs for home video. The Collection completed six programs during the year: Dinosaurs, Insects, Gems and Minerals, First Ladies, The National Zoo, and The Flying Machines. Production began on a comprehensive tour of Smithsonian museums, called Supertour.

OTC worked on several projects designed to reach wider audiences. A Spanish-language television pilot consisting of four two-minute features debuted at the National Hispanic Media Conference to very positive reviews. The pilot was financed by a Smithsonian Educational Outreach grant, and fundraising is under way to support further production. A Latino media consultant prepared a report on long-range goals for Smithsonian media programs intended for Latino audiences. In addition, planning has begun for a radio series presenting a native-American perspective on the Columbus Quincentenary, and funds are being sought for a new series of vignettes for African-American commercial radio.

Working with the National Museum of Natural History, OTC has conceived a one-hour film on Seeds of Change in connection with the Columbus Quincentenary. Development continues on a major project for children ages 9-12, combining interactive video and television to present a full picture of the world in 1492. The project explores the uses of new technology to support learning by discovery.

In the near future, OTC will more actively market its award-winning programs. The popular film Movie Palaces and the new production The Earth in Our Hands will both receive concentrated attention so they reach the broadest possible audience.

III. Visitor Information and Associates' Reception Center - With base funding of 2 workyears and \$183,000, the Visitor Information and Associates' Reception Center (VIARC) is a central support unit responsible for Institution-wide information and assistance programs for the public, Associate members, Smithsonian staff, and volunteers. Operating seven days a week, many VIARC programs involve coordinating and directing volunteers who constitute a primary source of support for the Institution's public information programs and for project assistance behind the scenes.

Information services include operating the Smithsonian Information Center; staffing 16 museum information desks in 11 buildings; staffing 2 Associates' reception desks; answering the Institution's public inquiry telephone lines; providing daily recorded information on Dial-A-Museum and Dial-A-Phenomenon; and responding to the Institution's public inquiry mail. VIARC also operates mobile information units out of doors during summer months and regularly conducts special tours of the Smithsonian

Institution Building known as the Castle. VIARC also administers the Institution's exterior graphic information system. Other support services include recruiting and placing volunteers behind the scenes and operating an outreach program to promote previsit education and membership.

The Information Resources Division compiles, coordinates, and produces a variety of reference materials, information aids, and publications to support VIARC programs. This Division also oversees the prepublication review of visitor-oriented materials prepared by other Smithsonian offices.

Accelerated recruiting and training activity has increased the volunteer information specialists corps to more than 600. This level allows VIARC to staff the 74 daily information desk assignments and the Smithsonian Information Center. Outreach efforts continue to increase minority participation in this program. The Telephone Information Service handled more than 450,000 calls in FY 1989. The popular Dial-A-Phenomenon recording on short-lived celestial events attracted thousands of interested callers. Specially recorded information telephone lines provided highlights of Smithsonian activities during Black History Month, Women's History Month, Asian-Pacific American Heritage Week, and Hispanic Heritage Month. The Public Inquiry Mail Service received and handled some 65,000 pieces of general information and research mail.

VIARC's exterior graphic information system moved ahead with installation of directional signs to the Anacostia Museum and general information directories on the Mall, a joint project of the National Park Service and the Smithsonian Institution.

Some 1,700 behind-the-scenes volunteers were active during the year, providing short- and long-term assistance on special projects including translation services in 38 languages.

IV. Office of Public Affairs - With base funding of 12 workyears and \$664,000, the Office of Public Affairs (OPA) acquaints the public with the programs and policies of the Institution by working with newspapers, magazines, television, and radio to gain media exposure for its exhibits, public events, and research. A major goal of the Office is to encourage culturally and economically diverse audiences to take part in the many resources of the Smithsonian.

In an effort to describe these resources to the millions of people who are unable to visit the Smithsonian museums, the Office prepares the Smithsonian News Service, which provides more than 1,000 daily and weekly newspapers with a free, monthly package of four feature-style articles on subjects in art, history, science, technology, and contemporary life. The News Service translates one of the four articles into Spanish. This translation accompanies the English versions to 100 Hispanic and bilingual newspapers in the United States (including Puerto Rico) and Canada and more than two dozen newspapers and publications in Latin America. Based on the results of a FY 1989 readership survey, in FY 1990 the News Service will change its format to be more useful to its subscribers. It will, however, continue to emphasize stories of particular interest to culturally diverse audiences.

In FY 1989, OPA substantially expanded its programs to reach a broader range of ethnic communities, including African Americans, Hispanics, and native Americans. It also began a program of media outreach to Asian Americans. The programs involve the coordinated preparation and distribution of news releases, brochures, public service announcements for radio and television, and direct media contact. The theme of this

program is "The Smithsonian Is for Everybody." OPA produced media-related programs for the African-American community, including a television public service announcement, radio and newspaper advertisements, a monthly calendar of events for African-American newspapers, and bus and subway posters. For Hispanic audiences, OPA also prepared news releases and radio public service announcements, a calendar of events, a television public service announcement, and a brochure of Latino resources. The Office coordinated the participation of the Smithsonian at the annual Hispanic Media Conference in FY 1989, thereby acquainting 1,200 journalists with the resources of the Smithsonian. This effort included a major address by Smithsonian Secretary Robert McC. Adams and an exhibition.

The staff also produced two television public service announcements with a multi-heritage focus. The Office successfully launched a native-American internship. The intern, a Seneca Indian, prepared an exhibit for the National Indian Educators Conference, developed new mailing lists, and designed a newsletter for outreach to tribal communities.

OPA focuses on the communication of research activities to the media through direct contact with journalists, resulting in many major articles appearing in such national publications as the New York Times and the Washington Post. In FY 1988, the circulation of Research Reports, a periodical devoted to reports on research in the arts, history, and science, reached a record of nearly 55,000 readers, including the scholarly community, foundations, universities, and Smithsonian contributing members. As a result of the readership survey, the Office is also revising the format and contents of this publication to make it more useful to its broad constituencies. In addition, the Office completed writing and editing a new booklet that describes behind-the-scenes research at the Smithsonian. When published in FY 1990, the booklet will be useful to United States and foreign researchers, journalists, and visiting dignitaries.

OPA prepares a wide variety of other publications, including the Smithsonian monthly staff newspaper, The Torch, visitor brochures in English and six foreign languages, a guide for disabled visitors, a brochure on the Smithsonian for journalists, a monthly calendar of events, and flyers for various bureaus such as the Smithsonian Tropical Research Institute and the Anacostia Museum.

OPA conducts and coordinates extensive media campaigns on behalf of the Institution to publicize many events. In FY 1989, this included the observance of Hispanic Heritage Month, Black History Month, and Asian-Pacific American Heritage Week.

In addition, the Office designed and carried out media campaigns on behalf of the Anacostia Museum exhibition, "The Real McCoy: African-American Invention and Innovation, 1619-1930"; the International Gallery exhibition, "Caribbean Festival Arts"; the dedication of the new Mathias Laboratory at the Smithsonian Environmental Research Center; Smithsonian activities commemorating the bicentennial of the French Revolution; and the Festival of American Folklife. The Office also worked closely on advertising and publicity plans for the television series Smithsonian World, the Smithsonian Video Collection, and the Columbus Quincentenary.

OPA advises Smithsonian bureaus and offices on public information policies and programs. The Office monitors their public information materials, the Institution's many relations with corporate and other sponsors, and the advertising and promotional

teleplans and materials of corporate sponsors. OPA informs management of public and media attitudes and needs.

The Office continues to receive acclaim for the work of its staff from the National Association of Government Communicators and the Society for Technical Communications.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Office of the Assistant Secretary for Public Service requests 6 workyears and \$445,000; for its immediate office, clerical support (2 workyears and \$53,000); for Telecommunications, clerical support (1 workyear and \$22,000); for the Visitor Information and Associates' Reception Center, supervisory information receptionists (2 workyears and \$40,000), automated systems maintenance (\$40,000), increased printing costs (\$30,000); for the Office of Public Affairs, for clerical support (1 workyear and \$24,000), increased printing costs (\$50,000), and Columbus Quincentenary activities (\$36,000). An increase of \$100,000 justified in the Uncontrollable Increases section of this budget will support the Assistant Secretary's, Office of Public Affairs' and the Office of Telecommunications' payroll base deficiencies.

I. Office of the Assistant Secretary for Public Service:

Clerical Support (2 workyears and \$53,000) - The Deputy Assistant Secretary for Media Affairs provides administrative oversight of public service programs, especially related financial and legal matters and newly developing technology in various Smithsonian print, audio, and video projects. The deputy monitors compliance with contract terms and donations received and will provide legal advice to the Institution's public service bureaus. The addition of a secretary (1 workyear and \$25,000) will provide clerical services needed to implement these new initiatives of the Deputy Assistant Secretary for Media Affairs.

The Office also requests funding for a fiscal technician (1 workyear and \$28,000) to assist the administrative officer. The administrative officer provides oversight to public service bureaus on all administrative matters and reviews budget requests and formulation. The fiscal technician will reconcile accounts on a monthly basis and document accounts receivable. The position will also monitor contracts for compliance with contract terms and timeliness of reporting and prepare financial reports for special purpose funds. In addition, the fiscal technician will compile data for final budget formulation by the administrative officer.

II. Office of Telecommunications:

Clerical Support (1 workyear and \$22,000) - The Office of Telecommunications creates media programs to reach new audiences and fulfill the Smithsonian's education mission nationwide. The capacity to develop new programming for new or underserved audiences depends heavily on the addition of clerical support.

The requested clerk-typist (1 workyear and \$22,000) will provide support for a variety of ongoing and special office projects, including an expanded version of "Radio Smithsonian," the "Smithsonian Quest" children's television series, both the English- and Spanish-language television feature series, and new documentary programs on scientific and cultural issues. The clerk-typist will provide clerical support for the preparation of scripts, transcripts, program proposals, contract and procurement documents, and general correspondence.

In the future, electronic media will continue to grow in importance as educational tools. To achieve the "diffusion of knowledge," the Smithsonian must develop projects that carry information beyond the museums in Washington, D.C., with particular emphasis on wider audiences. This is a direction OTC takes very seriously. While OTC will seek funding from outside sources for major programs, increased clerical support is essential in developing and planning such projects.

III. Visitor Information and Associates' Reception Center:

Supervisory Information Receptionists (2 workyears and \$40,000) - VIARC requires additional supervisors to direct, train, and coordinate volunteers. VIARC's corps of more than 600 volunteer information specialists staff 16 desks in 11 buildings seven days a week to provide information about the Smithsonian Institution, its exhibitions, events, programs, and activities. On-site supervision, evaluation, direction, training, and continuing education of these volunteers, as well as the task of establishing and maintaining communication networks among key personnel in the museums, falls to VIARC's supervisory information receptionists.

As the Institution has expanded--relocating the National Museum of African Art to the Mall and opening the Arthur M. Sackler Gallery, the S. Dillon Ripley Center, and the Smithsonian Information Center--Federal staffing support for this pan-Institutional public information program has not kept pace. Only two of VIARC's 28 full-time staff positions are Federal. The need for increased Federal staffing is particularly acute in the area of supervisory information receptionists. Currently, VIARC's Trust funded 4.6 supervisory information receptionists work in several museums and are responsible for more than 100 volunteers each. The Museum Information Desk Program is currently 40 percent understaffed.

The addition of two Federal positions for supervisory information receptionists (2 workyears and \$40,000) will enable VIARC staff to supervise the activities of its over 600 volunteers at 16 information desks in 11 buildings without a reduction of service.

Automated Systems Maintenance (\$40,000) - In FY 1989 and FY 1990, VIARC will establish an office automation network and a local area network to assure timely and effective internal information management. This network is required, as VIARC staff members are located in offices throughout the Smithsonian Institution Building. This automated system will also extend information campus-wide by:

- linking the information desks in each museum;
- decreasing response time to public mail inquiries;
- increasing cooperative program efforts among bureaus with common interests, thereby reducing duplication of effort;
- communicating changes in program activities to museum volunteers and staff.

Given the constantly changing nature of public information, an effective and efficient internal communications system is vital to support existing program operations. The network equipment will require periodic maintenance and repair. However, initial equipment warranties and guarantees expire in 1990. The requested funding (\$40,000) will provide preventive maintenance, parts, and technical support

costs for office automation equipment. Funding will assure continued access to computer data bases and record-keeping programs.

A regular maintenance and technical support program for the new automated system will allow continuous access to stored data bases and record-keeping programs. With this addition, VIARC will provide the quality Institution-wide assistance audiences have come to rely upon.

Printing Costs (\$30,000) - VIARC is the central information and orientation point for visitors to the Institution. Additional printing funds will allow VIARC to fulfill requests for print material from visitors at 16 information desks in 11 buildings, as well as fulfill requests received by telephone and the mail.

The requested funds (\$30,000) will meet the anticipated audience demands of the new Smithsonian Information Center (SIC), opening in FY 1989, which is expected to attract three million visitors annually.

Current funds meet only one-half of VIARC's printing needs. Without the requested increase, availability of printed materials will drop below the 50 percent level as audiences continue to increase.

IV. Office of Public Affairs:

Clerical Support (Minority Outreach) (1 workyear and \$24,000) - The Office of Public Affairs must reach audiences not adequately represented in Smithsonian activities. These audiences include African Americans, Hispanics, Asian Americans, and native Americans. They are reached primarily through the mass media.

The addition of a clerk-typist (1 workyear and \$24,000) will permit the Office of Public Affairs to reach underrepresented audiences in a more timely fashion and for a wider variety of services. Public affairs specialists are currently laboring to perform minority outreach functions without clerical assistance. With assistance, the specialists will be able to address projects that are currently on hold.

The additional clerical position will help notify larger minority audiences about Smithsonian activities and programs.

Printing Costs (\$50,000) - The Office of Public Affairs prepares informational materials for more than 28 million visitors a year. OPA also informs an increasingly diverse audience through special-interest media and languages other than English.

Because printing costs have risen faster than inflation, and because the number of visitor brochures must be increased to serve an expanding audience, printing activities now require a \$50,000 base increase.

OPA will use the requested funds to inform the public by printing the Smithsonian calendar of events in the Washington Post, the Afro-American and the El Latino newspapers. The calendar is also distributed to specialized mailing lists. The funds will also support the "Welcome" brochure for visitors, printed in English and six foreign languages. More than a million copies of the English brochure alone are distributed annually to visitors and Congressional offices.

The funds requested will ensure that basic printed information about the Smithsonian will continue to be available to the public.

Columbus Quincentenary Promotion (\$36,000) - Funding is requested to inform the public about the Smithsonian's Columbus Quincentenary observances.

The Smithsonian's pan-Institutional Columbus Quincentenary Program will commemorate the voyages of Columbus to the Americas through exhibitions, symposia, publications, and television. The Program will focus on cultural, historical, and scientific implications of the encounter between Europeans and indigenous peoples. Its issues will continue to be of global importance into the 21st century. As the Columbus Quincentenary will incorporate the contribution of Hispanic and native-American cultures, OPA will make a special effort to involve these audiences in the observances.

Promotion of all Quincentenary activities will include \$18,000 for production of television public service announcements, \$3,000 for production of radio advertising, and \$15,000 for the purchase of radio air time.

The requested funds will help make sure the public is aware of the Smithsonian's Columbus Quincentenary activities.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds:

I. Office of the Assistant Secretary for Public Service - Annual allotments provide for the salary, benefits, and support costs of staff members assigned to the immediate Office of the Assistant Secretary for Public Service and consultants for electronic media activities.

Trust funds also support expenses associated with the Office of Wider Audience Development, including the Cultural Education Committee, which fosters the development of pan-Institutional outreach efforts designed to attract diverse cultural audiences. A Special Purpose fund provides for the Educational Outreach Fund, which fosters research on improved, expanded, and innovative methods of outreach activity. While this Office administers the funds, the accounts of recipient organizations reflect the expenditures.

II. Office of Telecommunications - An annual operating allotment provides support for nine full-time staff members and costs associated with the production of educational and informational materials for television, film, and radio. Nominal subscription fees received for the "Here at the Smithsonian" television series and "Radio Smithsonian" help defray production and distribution costs. The sale of films and video programs provides additional funds.

III. Visitor Information and Associates' Reception Center - An annual operating allotment supports the Center's work as the Institution's public service bureau responsible for the information and assistance activities.

IV. Office of Public Affairs - Allotments provide support for public outreach activities such as wider audience advertising with the African-American, Hispanic, native-American, and Asian-American media, and public service announcements for radio and television.

SMITHSONIAN INSTITUTION PRESS

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	29	1,239	40	15,025	-	-	-	-	-	-
FY 1990 Estimate	29	1,286	40	19,490	-	-	-	-	-	-
FY 1991 Estimate	31	1,472	40	17,651	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - A member of the Association of American University Presses since 1966, the Smithsonian Institution Press (SIP) is responsible for editing, designing, producing, and distributing books, sound recordings, and other printed materials prepared by staff scientists, historians, and curators, as well as scholars from educational institutions around the world. Such materials also include research monographs, technical and scientific series, exhibition catalogues for Smithsonian museums, educational pamphlets, and informational leaflets.

For FY 1991, the Smithsonian Institution Press requests an increase of 2 workyears and \$186,000 for electronic data base publishing (2 workyears and \$110,000); and for the Columbus Quincentenary publishing program (\$20,000). An increase of \$56,000 justified in the Uncontrollable Increases section will support the Smithsonian Institution Press' payroll base deficiency.

PROGRAM - The Federal publication activity of the Press is a fundamental extension of the Smithsonian's basic research activities. The scientific, technological, and historical monographs that the Press publishes propagate research by Smithsonian curators and staff experts to libraries, museums, research institutions, and interested members of the public throughout the United States and abroad. Because of the Smithsonian's extensive use of computers to compile research results, the Press is able to assemble a wholly electronic typescript of each federally funded research monograph. The Press's desktop publishing equipment eliminates the cost of phototypesetting for all of these publications. The resulting cost containment has enabled sponsoring Smithsonian bureaus to restrain the escalation of their publications budgets without having to curtail their publishing programs. In addition to publishing research findings, the Press edits and designs exhibition catalogues, educational pamphlets, and informational leaflets that serve the millions of visitors to the Smithsonian in Washington, D.C., and the extensive programs conducted nationwide and worldwide.

Additionally, the Press acts as the official agent of the Smithsonian Institution in procuring services from the Government Printing Office (GPO) to create government forms, museum guides, and instructions, as well as in providing professional

assistance to Smithsonian authors upon request. The Press also edits, designs, and produces Smithsonian Year, the Institution's annual report to its Board of Regents and the Congress.

Federally funded books published during FY 1989 include The Great Tzotzil Dictionary of Santo Domingo Zinacantan with Grammatical Analysis and Historical Commentary, by Robert M. Laughlin with John B. Haviland (Smithsonian Contributions to Anthropology, no. 31); Field and Laboratory Investigations from Victoria Land and the Thiel Mountains Region, Antarctica, 1982-1983 and 1983-1984, edited by Ursula B. Marvin and Glenn J. MacPherson (Smithsonian Contributions to the Earth Sciences, no. 28); Seagrasses, by Ronald C. Phillips and Ernani G. Menez (Smithsonian Contributions to the Marine Sciences, no. 34); The Autochthonous North American Musk Oxen Bootherium, Symbos, and Gidleva (Mammalia: Artiodactyla: Bovidae), by Jerry McDonald and Clayton E. Ray (Smithsonian Contributions to Paleobiology, no. 66); and Technology in Miniature: American Textile Patent Models, 1819-1840, by Barbara Suit Janssen (Smithsonian Studies in History and Technology, no. 49).

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Smithsonian Institution Press requests an increase of 2 workyears and \$186,000 for electronic data base publishing (2 workyears and \$110,000); and for the Columbus Quincentenary publishing program (\$20,000). An increase of \$56,000 justified in the Uncontrollable Increases section will support the Smithsonian Institution Press' payrollbase deficiency.

Electronic Data Base Publishing (2 workyears and \$110,000) - With these resources, the Press will create an electronic publishing program to increase and enhance the accuracy of Smithsonian research data bases. A highly developed technology for electronic publishing now exists; and this increase guarantees that outside researchers will have better access to more timely information.

Two types of research publications need electronic dissemination: collections of data used by other researchers throughout the world as input for their own work, and massive, encyclopedic distillations of research results. Both types are subject to continuous modification as a result of ongoing research. In the time it takes to produce a printed copy and make it accessible to users, new information renders that publication obsolete. Further, electronically accessed data capable of being incorporated directly into the user's document is more valuable. A computer search for desired information is far superior to a printed index.

Electronic publication will use a variety of media: magnetic (tape or floppy discs), optical (CD-ROM, video discs, etc.), and on-line (telephone dial-up). The additional staff and support costs will:

- establish distribution channels appropriate to the various electronic media, including cooperative relationships with other Federal agencies and the Depository Library Program;
- help researchers incorporate electronic publishing into the design of their research projects;
- advise researchers on the maintenance and development of data bases slated for electronic publication;
- develop Smithsonian standards for protecting the integrity of Smithsonian data bases;

-- oversee all arrangements for each federally funded electronic data base publication, including contracting through GPO for necessary preparation and manufacturing services.

The two staff positions requested also will supply needed support for the electronic dissemination of Smithsonian research data bases. This expansion will allow the Smithsonian Institution Press to function as the electronic publisher for Smithsonian research compilations subject to continual updating.

Columbus Quincentenary Publications Program (\$20,000) - The planned observances of the anniversary of the Columbus landing of 1492 provide a matchless opportunity for the American people to reflect on the 500-year encounter between the Old and New Worlds. It is altogether appropriate that the Smithsonian Institution take a leading role in the coordination of a national program of research, reflection, and celebration. Within the constellation of exhibitions, new scholarship, and outreach activities planned by the Smithsonian, the publication of books for the general public and for the scholarly community is an especially important task.

At the center of the Press's Quincentenary publishing program is the Columbian Consequences project. This three-volume series addresses the social, demographic, ecological, and ideological repercussions of Columbus's arrival. Deliberately timed to precede the observances of 1992, the series explores the nature of early European-native American interaction across the Spanish Borderlands, the area of Spanish colonial settlement in the New World running from northern California to Florida. The project is being carried out for the Press under the direction of Dr. David Hurst Thomas, member of the National Academy of Sciences and curator at the American Museum of Natural History, New York.

Columbian Consequences is prepared and offered in response to the dual challenge facing the American scholarly community as it looks toward the celebrations of 1992. Already a host of events, presentations, and exhibitions for the interested public, as well as symposia and specialized publications, reflect an upsurge in scholarly activity around issues raised by the Quincentenary. These generalized and specialist endeavors tend to proceed along parallel and nonintersecting tracks. Columbian Consequences represents a fundamental synthesis of these two approaches by exploring the range and diversity of contemporary thought about the encounter and by providing an interested public with an accurate and factual assessment of what did and what did not happen during that crucial period in America's, and the world's, history. Indeed, a principal reason for completing the series by 1991 is to provide this important and authoritative resource to all the community and educational groups preparing programs that explore the many aspects of the Quincentenary. Columbian Consequences, when completed, will represent at once the broadest and most academically up-to-date account of the Spanish colonial period available to the public.

This vast project draws together the research of more than 100 scholars in the fields of anthropology, archaeology, history, and geography and includes contributions from native-American scholars. The first volume has been published with other Press resources, but additional funds are required for honoraria for commissioned articles, preparation of maps, and partial support of Dr. Thomas's three years of research and editorial development of this complex project.

The Columbian observance of 1992 should be an occasion for the self-education of the American people at least as deep and far reaching as the American Revolution Bicentennial of 1976. The Columbian Consequences project will help to stimulate wide-

spread public discussion on the social, demographic, ecological and ideological repercussions on this important historical period.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - The sale of Trust-funded books and recordings, royalties, and special publishing services produce these resources. The funds thus produced support the necessary services required to develop, market, warehouse, and distribute records and scholarly and general interest books published in connection with the Institution's research collections, exhibitions, and other programs.

University Press Division - Both the public and the scholarly media noted publication of several University Press titles this year, particularly Women of Deh Koh: Lives in an Iranian Village, by Erika Friedl; The Recovery of Meaning: Historical Archaeology in the Eastern United States, by Mark P. Leone and Parker B. Potter; and Men and Women: Dressing the Part, by Claudia Brush Kidwell and Valerie Steele. At the same time, the Press continued to strengthen and deepen the subject diversity of its list by the quality and number (approximately 85) of books published in the fields of art, science, anthropology, archaeology, aviation, and history. The lead title in the Press's new publishing field of music is Thomas L. Riis's Just before Jazz: Black Musical Theater in New York, 1890 to 1915, illustrated with photographs, sheet-music facsimiles, musical examples, and newspaper reviews.

The Press has announced a new series, the Smithsonian History of Aviation, and this year will publish the lead title: Strike from the Sky: The History of Battlefield Air Attack, 1911-1945, by Richard P. Hallion. Other aviation titles published include Combat Flying Equipment: U.S. Army Aviators' Personal Equipment, 1917-1945, by C. G. Sweeting; Cierva Autogiros: The Development of Rotary-Wing Flight, by Peter W. Brooks; and (new in paperback) A Dream of Wings, by Tom D. Crouch.

The Smithsonian Series in Archaeological Inquiry was enhanced this year by publication of the first of two volumes reporting evidence of human habitation in the ancient site of Monte Verde: A Late Pleistocene Settlement in Chile, by Tom D. Dillehay. Off the press at almost the same time was the first volume of David Hurst Thomas's three-volume Quincentenary series on the Spanish Borderlands (the northern rim of New Spain): Columbian Consequences: The Californias, Texas, and the Southwestern Heartland. Volumes published in that Smithsonian Series in Ethnographic Inquiry include: Pilgrims of Paradox: Calvinism and Experience among the Primitive Baptists of the Blue Ridge, by James L. Peacock and Ruel W. Tyson, Jr.; and Ritual Passage, Sacred Journey: The Form, Process, and Organization of Religious Movement, by Richard P. Werbner.

Publishing in the natural sciences was notable for the Press in this fiscal year, with these titles in the lead: Sharks in Question: The Smithsonian Answer Book, by Victor G. Springer and Joy P. Gold; Turtles of the World, by Carl H. Ernst and Roger W. Barbour; Marine Plants of the Caribbean: A Field Guide from Florida to Brazil, by Diane Littler, Mark Littler, et al.; and The Restless Sun, by Donat G. Wentzel.

Smithsonian Collection of Recordings - The Recordings program publishes both popular recordings suitable for direct mail marketing to Smithsonian Associates and recordings of scholarly interest. During FY 1989, the program released Beethoven: Piano Trios, Op. 70 with the Castle Trio performing on original instruments. Another release was The Twelve Trio Sonatas, Op. 3 of Corelli, performed by the Smithsonian

Chamber Players. Two more additions to the classical repertoire were recently released: Beethoven: Op. 18 String Quartets, and Hayden: Op. 77 String Quartets, both performed by the Smithsonian String Quartet. With its continuing emphasis on American contributions to musical heritage, the Recording program produced Jazz Piano, programmed by Martin Williams; American Musical Theater program annotated by Dwight Bowers; and two rereleases in the compact disc format: Revised Classic Jazz, programmed by Martin Williams; and American Popular Song, programmed by Dwight Bowers, James Morris, and J. R. Taylor. This year, for the fifth year in a row, a Smithsonian Collection release, The Classic Hoagy Carmichael, produced with the Indiana Historical Society, received nominations for National Academy of Recording Arts and Sciences (NARAS) "Grammy" awards in the categories of Best Historical Album and Best Album Notes.

Smithsonian Books - The "popular book" division of the Press, Smithsonian Books publishes books for a general audience on subjects that relate to Smithsonian collections and research interests. These books, marketed primarily by direct mail to Smithsonian Associates and other lists, are also available to the general public through licensing arrangements with several trade publishers, including the sales force of the University Press Division. Some of the titles currently available are Lords of the Air: The Smithsonian Book of Birds; Images of America: A Panorama of History in Photographs; In the Age of Mankind: A Smithsonian Book of Human Evolution; Exploring the West; The Smithsonian Book of Flight; The Smithsonian Book of North American Indians; and Treasures of the Smithsonian. In addition, Smithsonian Books has successfully marketed a 60-minute video, The Magnificent Whales. The goal of the program is to continue publishing well-written, carefully researched, commercially successful, and critically well-acclaimed books and related videos.

For FY 1990, Smithsonian Books plans to publish an anthology of Smithsonian magazine articles to commemorate the 20th anniversary of the magazine, and a sequel to the Smithsonian Book of North American Indians titled After Columbus: The Indians of North America since the Coming of The Europeans, by Herman Viola.

OFFICE OF FOLKLIFE PROGRAMS

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	7	801	15	795	-	164	-	231	-	1,500
FY 1990 Estimate	8	826	15	795	-	100	-	618	-	1,800
FY 1991 Estimate	11	1,100	15	817	-	100	-	700	-	1,700

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Folklife Programs (OFP) researches, conserves, and presents living folklife traditions found in the United States and abroad. Major activities include the annual Festival of American Folklife, Smithsonian Folkways Records, the Smithsonian Folklife Studies series of publications and documentary films/recordings, research projects, museum exhibits, symposia for the Columbus Quincentenary, educational projects, and the Folklife and Folkways Archives. (For FY 1990 and prior years, budget information for the Office of Folklife Programs appeared in the Special Programs section as part of the American Studies and Folklife Programs line-item.)

For FY 1991, the Office of Folklife Programs requests 3 workyears and \$274,000 for cultural conservation research (\$100,000); Columbus Quincentenary programs (2 workyears and \$150,000); and a fiscal technician (1 workyear and \$24,000).

PROGRAM - The Office of Folklife Programs researches American and worldwide folklife traditions and publishes and presents research to scholarly and public audiences. OFP conserves folklife traditions through documentary and archival collections of music, narrative, performance, and material culture. The annual Festival of American Folklife, held on the Mall, gives national recognition to thousands of traditional musicians, craftspeople, and other artists. The Festival encourages participants to maintain and transmit their cultures to future generations. The Festival and other OFP activities also allow the public to learn about diverse American cultures and the cultures of other nations. OFP cooperates with other Federal and State agencies to advance the Nation's interest in folklife.

Research and Publications - OFP currently engages in research on folklife traditions in Hawaii, Washington, D.C., and Francophone America; the traditions of African-Americans in Philadelphia; immigrant cultures from Latin America and Southeast Asia; Navajo music; American-Indian cultural resource issues; and the culture of family farming in the United States. International projects include the study of

African epics; Indian folk arts; Soviet and Soviet-American music and folklore; Indonesian culture; and Caribbean and Brazilian music and culture.

OFP disseminates research through scholarly journals and presentations, Smithsonian Folkways Records, Quincentenary symposia, a program book published for the Festival of American Folklife, and the Smithsonian Folklife Studies series. Series releases this year include the documentary films Kathputli: The Art of Indian Puppeteers and Onggi: Korean Folk Pottery. Other scholarly projects include articles on cultural representation and conservation, publications on native-American subsistence and expressive culture, Caribbean cultural history and folklife, and a radio series on American and world music traditions. Smithsonian Folkways albums, with scholarly notes, include Musics of Hawai'i, Cajun Social Music, Puerto Rican Music in Hawai'i, Hawaiian Drum Chants, Big Bill Broonzy Sings Folk Songs, and children's albums by Ella Jenkins. Folkways: A Vision Shared, a tribute to Woody Guthrie and Leadbelly produced through Columbia Records, won the 1989 Grammy for Best Traditional Recording.

Exhibitions and Public Programs - The Smithsonian's Festival of American Folklife, held annually on the Mall since 1967, has stimulated broad interest in traditional culture and provides a model for the research-based presentation of culture. In 1989, the Festival featured programs on Hawaii, French culture in France and North America, the cultural conservation of American-Indian cultures, and Creolization in Caribbean culture. The Festival drew an estimated 1.5 million visitors and generated massive media attention and critical acclaim.

The Festival had effects beyond the Mall: Hawaii plans to restage the exhibition in that State and expand its folk arts program; Caribbean research materials will bolster archives through that region; and the American-Indian program will aid in planning traveling exhibitions. As a national and international model for the research-based living presentation of culture, the Festival hosted observers from the Soviet Union, France, Jamaica, Vietnam, Canada, Pakistan, a variety of State arts agencies, and U.S. universities and other festivals and institutes.

During FY 1989, OFP scholars also participated in a symposium "Seeds of Commerce," the second in a series of Quincentenary symposia dealing with New World cropping systems and related cultural expressions. Through the Smithsonian Institution Traveling Exhibition Service, OFP is currently touring "The Grand Generation," an exhibition on the folklife of the elderly. Future plans include museum and traveling exhibitions on Southeast Asian immigrants, American-Indian cultural continuity, and African-American urban traditions.

For FY 1990, OFP plans Festival programs on the cultural importance of the family farm in the U.S. heartland and on the revival of musical traditions in local communities. OFP plans future programs with the States of New Mexico, Washington, and Missouri and with the Virgin Islands as well as programs on the folklife traditions of native peoples of the New World and on the forms of culture resulting from Columbus's voyages and the subsequent juxtaposition of cultures. OFP is discussing country programs with Algeria, China, the Soviet Union, the Arab Gulf States, Thailand, Indonesia, Australia, Pakistan, Madagascar, Senegal, Spain, and many Latin American nations.

Archives and Education - The Folklife and Folkways Archives contain audiotapes, records, videotapes, photographic images and film, paper files, and books documenting folklife traditions from all parts of the United States and some 47 countries.

Highlights of the collection include materials on occupational folklife, family folklore, immigration stories, American musical traditions, and the performance traditions of African-Americans, American Indians, and other ethnic groups.

The Archives is a valuable resource for ongoing research. In FY 1989, visiting fellows used the Archives to research American folk musics, Hispanic culture, African-American performance traditions, American-Indian program impacts, Southeast Asian immigrant folktales, Pakistani folk beliefs, and other topics. Major archival activities include accessioning Folkways materials, conserving folklife materials, and cataloguing folklife materials.

Educational projects include developing OFP materials for schools around the country and initiating the Summer Folklore Institute for community-based "amateur" researchers, particularly from minority groups. This unique program enabled 12 community scholars to join with museum and academic experts to develop a broad-based strategy for studying and representing diverse, grass-roots American traditions.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Office of Folklife Programs requests 3 workyears and \$274,000 for cultural conservation research (\$100,000); Columbus Quincentenary programs (2 workyears and \$150,000); and a fiscal technician (1 workyear and \$24,000).

Cultural Conservation Research (\$100,000) - Threats to the integrity and continuity of traditional cultures have become the shared concern of scholars, public officials, and local communities. World patterns of environmental destruction and externally controlled economic institutions and communications media continually erode many long-lived traditions. Distortion and destruction of locally based cultures not only decrease the world's knowledge about the natural environment and human society but also lead to social problems resulting from loss of cultural identity and intergenerational communication.

These problems require greater attention and understanding. To this end, the Office will undertake research in the following areas:

- the availability of natural resources and social exchange for traditional cultural needs and their denial through environmental destruction or government policy;
- the social consequences of minority status and tradition-based cultural responses to them;
- minority language retention and loss and their effect on cultural traditions.

Principal areas of research will be African-American, American-Indian, Hispanic-American, and other ethnic and regional minorities, both long established and recently arrived. Research leading to published texts, videotapes, and audiotapes will enable greater understanding of the issues and create permanent records of endangered cultures.

Requested funding will support scholarly research of these cultures. Funds will pay for travel and per diem expenses necessary for extensive fieldwork. OFP also requires funds to contract with experts outside the Institution who have special skills and knowledge of special cultures.

Cultural conservation research will address issues of importance for disciplinary research and minority communities. Guided by both scholarly and public service objectives, the research program in cultural conservation will encourage the continuity, integrity, and equity of traditional but endangered cultures.

Columbus Quincentenary Programs (2 workyears and \$150,000) - The Columbus Quincentenary is a once-in-a-lifetime opportunity for all the peoples of the Americas. During this event, the indigenous peoples of North, Central, and South America will come to see the important contributions of their ancestors to modern mainstream American culture. Other Americans will come to understand how these diverse native traditions have influenced their own contemporary culture. By working together on the Smithsonian's Columbus Quincentenary activities, nations will develop a mutual appreciation and respect for their heritages.

The requested funds will provide an expanded base of \$240,000 to allow OFP to research and develop a living museum on the Mall in FY 1991 and FY 1992. This presentation will examine the expressive culture, including occupational folklore, music, rituals, and crafts associated with the agricultural and subsistence activities of native peoples throughout the Western hemisphere. Research will concentrate on traditional folklife associated with pre-Columbian agricultural systems that have survived, adapted, or changed over the past 500 years. OFP will conduct field research in selected but varied New World settings and employ scholars and experts from within the studied culture groups. Research will document:

- practitioners of indigenous ethnobotany and medicine;
- the occupational knowledge and skills associated with native hunting, gathering, and garden cultivating;
- craft, musical, ritual, and performance traditions associated with the production, distribution, and celebration of native foodstuffs and materials such as corn, potatoes, wild rice, fish, animal horns, and skins.

For FY 1991, OFP requests increased funding to hire a program coordinator (1 workyear and \$32,000) to assist in program development and a clerk-typist (1 workyear and \$22,000). Additional funds will support contract researchers and travel and documentation expenses (\$96,000). Documentation will include audio, video, and written materials.

With the Columbus Quincentenary, Americans from several nations will enjoy a common celebration of their diverse cultures. Participants will see not only the contribution of their own heritage to modern American culture, but also the impact of many nations' traditions, crafts, and skills on the American way of life.

Fiscal Technician (1 workyear and \$24,000) - The Festival of American Folklife directly reaches more than one million visitors to the Mall and additional millions through media coverage and the remounting of Festival programs in their home states. Despite computerized accounting systems, the fiscal demands on the Office of Folklife Programs have grown both in volume and complexity because of the multiple Festival funding sources and procurement constraints. A fiscal technician will monitor Festival funding to ensure the most effective use of these financial resources.

The responsibilities of the fiscal technician will include monitoring funding and expenditures, maintaining reliable computerized accounting records, preparing monthly reports, and reconciling Office accounts with those of the Office of Accounting and Financial Services. A fiscal technician following these procedures will promote the most efficient use of funding and hence the most effective presentation of folklife research highlighted in the annual Festival. This heightened accountability will also strengthen the Office's position for soliciting further funding from outside sources.

OFP will use the requested funds to hire one fiscal technician (\$24,000). This is a permanent position.

Many agencies provide funding for the Festival, including State and local governments, private organizations, and the Institution. It is in the best interests of all these agencies for the Office to maintain a sound financial records system. The Office of Folklife Programs must be accountable to those agencies supporting the Office's research.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Allotments and concessions at the Festival of American Folklife provide these funds, which support salaries and related program costs. The Smithsonian's Educational Outreach, Special Exhibition, and Research Opportunities Funds support such projects as the Summer Folklore Institute, the planning of an exhibition on the experience of Southeast Asian immigrants, and the conduct of scholarly research.

Restricted Funds - Individual gifts and grants from private foundations and corporations provide these funds, which OFP uses for specific programs or components. Funds in FY 1989 from the Hawai'i Visitors Bureau helped support the Hawai'i program. The American Committee on the French Revolution provided partial support for the French culture program at the Festival of American Folklife. Grants from the Music Performance Trust Funds supported the American-Indian and Caribbean programs. Additional gifts aided the publication of Folkways Records and supported other projects.

Government Grants and Contracts - Various State and local governments provide these funds to support performances and programs at the annual Festival of American Folklife. In FY 1989, OFP received these funds to support the Hawaii program.

ACADEMIC AND EDUCATIONAL PROGRAMS

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	15	813	7	622	-	4	-	-	-	-
FY 1990 Estimate	16	897	9	795	-	2	-	155	-	-
FY 1991 Estimate	17	937	9	817	-	2	-	6	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Research and education are among the principal objectives of the Smithsonian. To attain these goals, the Institution promotes scholarly and academic ties with other learned institutions and offers resources to the general public as well as the academic community. Scholarly and academic ties develop and flourish through programs in higher education, symposia and seminars, and learning opportunities at the elementary and secondary levels. This line-item includes the Office of Interdisciplinary Studies (OIS), the Office of Elementary and Secondary Education (OESE), and the National Science Resources Center (NSRC). (For FY 1990 and prior years, the Academic and Educational Programs budget line-item appeared in the Special Programs section. The Office of Fellowships and Grants, formerly presented in this line-item, is now a component of the Assistant Secretary for Research budget line-item.)

For FY 1991, the Office of Elementary and Secondary Education requests an increase of 1 workyear and \$56,000 to meet basic operating expenses. The Office also requests to retain \$22,000 of the \$38,000 provided to OESE in FY 1989 for its Columbus Quincentenary program to support a program for school teachers and administrators in conjunction with the Columbus Quincentenary.

PROGRAM:

I. Office of Interdisciplinary Studies - With base funding of 4 workyears and \$218,000, the Office of Interdisciplinary Studies explores gaps in scholarship. The Office presents findings of new research in the physical, natural, and human sciences and the humanities. Through symposia, colloquia, and seminars, the Office raises questions about issues and trends in modern civilization and publishes books and other educational materials based on these encounters. Thus, it serves both internal and external audiences. It is a vital public service link between the Smithsonian and partners in the world of learning.

In October 1989, OIS will present a major international symposium entitled, "Les Droits De L'Homme and Scientific Progress." Sponsored by both the Smithsonian and the National Academy of Sciences, the symposium will be the scholarly centerpiece of the

United States' commemoration of the 200th anniversary of the French Revolution, the Bill of Rights, and the French Declaration of the Rights of Man and the Citizen. Leading members of the science and technology communities of France and the United States will take part, first at Thomas Jefferson's Monticello and the University of Virginia in Charlottesville, Virginia, and then in Washington, D.C. As with all its international symposia, the Office anticipates the publication of a book and other educational materials based on information derived from the symposium.

As an outgrowth of a five-day international symposium, in 1987, entitled "Constitutional Roots, Rights, and Responsibilities," OIS completed a video entitled Democracy and Rights: One Citizen's Challenge. The production, a joint project with the Close-Up Foundation, explored the story of one citizen's pursuit of equal rights in the context of desegregation. Participants in the video production included Justice Sandra Day O'Connor, who served as narrator, and officials of the Close-Up Foundation. On May 2, 1989, OIS hosted the premiere screening of the video and received favorable responses from such viewers as Justice Lewis Powell, Justice O'Connor, and Regent Jeannine Clark. As a sequel to the video, OIS plans to produce another film documentary to emphasize duties and responsibilities that make the Constitutional system work.

For FY 1990, OIS will inaugurate a series of seminars, "Research on Contemporary Cultures and Civilizations," modeled in part on the World War II series at Columbia University organized by Ruth Benedict and Margaret Mead. Comparative studies of three cultures (including the United States) in each seminar will enhance Americans' understanding of other cultures and shed light on the multi-ethnic aspects of American culture. The seminars will focus on key myths and symbols around which plural societies and minorities organize their identities. Childhood socialization will be examined to find out how individuals learn to become adults in different kinds of cultures. Insight and data from the seminars--particularly on problems the United States has in communicating with other cultures--will eventually reach wider audiences through publications.

Consultation is under way in native-American research and educational institutions and other national and international arenas for ideas to incorporate in the 1992 symposium, "Exploring the Unknown," part of the Smithsonian's commemoration of the Columbus Quincentenary.

II. Office of Elementary and Secondary Education - With base funding of 7 workyears and \$415,000, the Office of Elementary and Secondary Education is the Smithsonian's central education office. It designs, develops, and implements Institution-wide programming in education. OESE disseminates the products of this programming locally, nationally, and internationally. It also develops Institution-wide policies and goals for education. National programs that exceed the scope of the individual museums and their respective education offices receive special attention.

OESE offers many programs to encourage cooperation and exchange of information between the Smithsonian and schools in the metropolitan Washington area. Let's Go, a newsletter published five times a year, informs more than 11,000 Washington area educators about the variety of learning opportunities available at the Smithsonian. In addition, a multi-disciplinary workshop and seminar program for teachers includes one-week courses on topics such as teaching life sciences through direct observation, using primary source materials to interpret history, and teaching American cultural history through art. Accredited by all metropolitan area school systems, these courses have served more than 350 teachers and administrators in FY 1989.

To share these same teaching concepts with a national audience, OESE distributes free to schools across the country the quarterly newsletter, ART TO ZOO. Since 1976, ART TO ZOO has been a highly regarded publication and a staple of OESE programming. It represents a cost-effective way of interpreting Smithsonian resources for a large and culturally diverse constituency of teachers, students, and museum educators. Currently, ART TO ZOO reaches more than 70,000 teachers (and two million students) in more than 25,000 schools; in addition, it goes to more than 100 museums that use it in program planning. This publication costs the Institution less than 27 cents per issue, a very low per teacher price. OESE also circulates, free of charge, slide-loan packages and curriculum kits, which reach an estimated 5,000 students yearly.

With the signing of the Rehabilitation Act of 1973, the Smithsonian became legally responsible for making its programs accessible to people with disabilities. To help the Institution fulfill this responsibility, OESE created a program that now serves as the central Smithsonian resource on museum access. The program offers staff and docent-training sessions and programs for and about disabled individuals. It also provides sign language instruction for Smithsonian employees and sign language interpreters for a wide range of Smithsonian programs. Since 1983, the demand for interpreter services has increased by more than 50 percent. Throughout FY 1989, the Office continued to make Smithsonian programs accessible to disabled visitors. This effort included, in addition to the above activities, dissemination to more than 300 organizations of a manual and videotape package designed to help museums, zoos, and historic sites across the country serve disabled people.

To commemorate the Columbus Quincentenary, OESE will develop a series of multi-cultural education packets written in English, Spanish, and Portuguese. The packets will introduce preschool age children to the cultural and animal life of the Americas. In addition, OESE will develop curriculum materials around the themes of a special Quincentenary television series.

III. National Science Resources Center - With base funding of 5 workyears and \$264,000, the National Science Resources Center is a joint undertaking of the Smithsonian Institution and the National Academy of Sciences to improve the quality of science and mathematics teaching in the Nation's schools. The NSRC identifies, develops, and disseminates science and mathematics teaching materials that are imaginative, classroom tested, and scientifically up to date. The Center also organizes leadership development institutes for science teachers and other school system personnel. These institutes encourage sharing of successful resource materials and help build a talent pool to staff local program improvement efforts. NSRC staff works with teachers, state and local school systems, research scientists, educational and scientific organizations, science museums, private foundations, and corporations to develop these programs.

In 1987, the Smithsonian Institution and the National Academy of Sciences established an advisory board for the National Science Resources Center that includes representatives from several major corporations, eminent scientists, and educational leaders throughout the country. The board counsels the NSRC executive director on broad policy issues and helps set priorities for the Center's programmatic activities.

Because there is a special need to increase the scientific and technological literacy of young children, NSRC has undertaken several projects to improve the teaching of science in the Nation's elementary schools. NSRC's Elementary Science Resource Collection and Computer Information data base is used by school systems and science museums that are initiating projects to improve the teaching of science in

elementary school. The data base includes bibliographic information and brief annotations about the materials in the Elementary Science Resource Collection. The data base is available to school systems across the Nation through a computer telecommunications network.

NSRC has also published an elementary science resource guide entitled Science for Children: Resources for Teachers. In addition to information about the materials in the Elementary Science Resource Collection, this guide includes a directory of science museums and other organizations that provide hands-on science kits and assistance to elementary school teachers. NSRC has distributed copies of this guide to the Nation's 16,000 superintendents of schools and members of the National Science Supervisors Association. Teachers, principals, parents, and the general public can obtain copies of Science for Children from the National Academy Press.

"Science and Technology for Children" (STC) is a four-year elementary science curriculum development project supported by a grant from the John D. and Catherine T. MacArthur Foundation. The project is developing curriculum units for grades 1-6 in the areas of physical science, life science, earth science, and technology. STC units use simple, inexpensive materials to teach science and link science to the broader elementary school curriculum by emphasizing reading, writing, art, and mathematics. Teachers across the country will field-test STC units to refine and validate them.

NSRC is developing a network of teachers, scientists, science educators, and school administrators who are working to improve the teaching of elementary school science. NSRC also sponsors leadership development institutes to prepare selected teachers, science supervisors, and principals to organize hands-on elementary science programs in their school districts. These institutes help school systems arrange effective in-service education programs, establish science materials support systems, and develop community support for their hands-on science programs.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Office of Elementary and Secondary Education requests 1 workyear and \$56,000 to meet basic operating expenses. Museums in general and the Smithsonian in particular represent a tremendous potential resource to address the crisis in education. However, the Institution has not fully reached this potential. Schools need to learn how to make better use of museums, and museums need to learn how to better understand and respond to the needs of the schools and other special audiences.

Through ART TO ZOO, regional workshops, summer courses, and other activities, the Office of Elementary and Secondary Education designs programs that make these connections in a very cost-effective way. Yet increased salary, printing, and other costs have forced OESE to eliminate one of four issues of ART TO ZOO and to discontinue Smithsonian Spectrum, a brochure on Smithsonian offerings for schools.

To recoup and extend its effectiveness, OESE requests an education specialist to promote its outreach efforts that will reach two specific audiences:

- people with disabilities, particularly those disabled individuals who are also members of racial minority groups;
- teachers and students in communities across the United States.

This outreach effort will benefit the general public (especially disabled persons) through better access to all museums and to the Smithsonian in particular. For

teachers and students, the program will improve knowledge and skills for using both the Smithsonian and local museums to enrich learning in the arts, sciences, and humanities.

With the requested resources, OESE will hire an education specialist (1 workyear and \$32,000) to support the accessibility program. This person will arrange for sign language classes for Smithsonian employees, conduct training sessions for docents, supervise newsletter production for retarded visitors, schedule sign language interpreters for Smithsonian events, and upon request, consult with exhibit and program designers in the various museums.

The requested increase will also allow OESE to keep pace with the rising costs of printing, contractual services, and supplies (\$24,000). With this funding, OESE will be able to resume publication of Smithsonian Spectrum and the fourth issue of ART TO ZOO.

Through OESE and its other educational programs, the Smithsonian can improve the quality of education for hundreds of thousands of young people in communities across the country. Expanded support for OESE's work will reinforce the Institution's current efforts to address the Nation's crisis in education and enable hundreds of school systems to reap the benefits that productive partnerships with their local museums including the Smithsonian can bring.

EXPLANATION OF PROGRAM CHANGE - With funding of \$38,000 provided in FY 1989 and requested for FY 1990, OESE is developing educational materials for preschool teachers and students in commemoration of the Columbus Quincentenary. For FY 1991, OESE requests to retain a portion of this funding (\$22,000) to undertake a second project for the Quincentenary.

Columbus Quincentenary Program - In 1985, the Smithsonian initiated planning for a pan-Institutional program to commemorate the 500th anniversary of the landing of Christopher Columbus in the Americas. The Institution's commitment to move beyond traditional Euro-centric interpretations to highlight the experience and contributions of all peoples affected by the Columbus landfall in the Americas has invigorated its plans to commemorate the Columbus Quincentenary.

As part of this multi-cultural perspective, the Office of Elementary and Secondary Education will concentrate its efforts in FY 1991 to help elementary and secondary educators improve their skills for teaching their students about Latin America. The program's three components are: a two-and-one-half-day symposium; a one-hour video; and a special issue of the periodical ART TO ZOO. In addition, the Office will publish a report on the symposium.

The symposium's focus will be the effects of cultural transplantation--from Latin America to the United States--on the folk art traditions of storytelling, textile arts, and music. OESE will develop this theme through scholarly presentations, performances by Latin-American and Latino artists, and workshop sessions demonstrating specific ways that teachers can apply in their classrooms the knowledge and insights they have gained from the performances and presentations.

The one-hour video will document the performances, while a special issue of ART TO ZOO will show teachers how to use multi-cultural resources in their own communities for teaching about Latin-America. The video, the conference report, and the special issue of ART TO ZOO will be available as a package to schools across the country.

OESE will use the retained funding to cover the costs of the symposium (\$18,000) and to publish the symposium report (\$4,000). OESE will seek outside funding for the video.

With the Columbus Quincentenary observance fast approaching, students in elementary and secondary schools around the country will soon take a renewed interest in learning about the experience and contributions of all peoples affected by the Columbus landfall in the Americas and about the effects of cultural transplantation. As a result of this program, their teachers will be better prepared to answer their questions and to use up-to-date multi-cultural resources to give the students a better understanding of the historical significance of the Quincentenary.

NONAPPROPRIATED SOURCES OF FUNDING:

I. Office of Interdisciplinary Studies:

Unrestricted General and Special Purpose Funds - An annual allotment from unrestricted funds provides funding for salaries and partial office support. In addition, the annual allotment supports certain program development costs including honoraria, publications, and travel costs for speakers appearing in symposia and colloquia.

Restricted Funds - Funds provided are in the form of restricted endowments that specify the use of donations or bequests and of gifts and foundation grants by individuals, organizations, or corporations for specific purposes. Examples of these funds are the Sergei N. Grimm endowment, which finances research related to scientific urban planning, and the Barrick W. Groom endowment, which perpetuates both inter-bureau and inter-disciplinary programs. During FY 1989, OIS received grants from the Florence Gould Foundation and the John D. and Catherine T. MacArthur Foundation for the international symposium entitled, "Les Droits De L'Homme And Scientific Progress."

II. Office of Elementary and Secondary Education:

Unrestricted General and Special Purpose Funds - As part of the Institution's affirmative action effort, a Career Awareness Program (CAP) for the District of Columbia Public Schools introduces minority young people to career opportunities at the Smithsonian. OESE plans and runs CAP with help from the various Smithsonian museums, whose staff members work directly with the students, providing first an overview and then more profound exposure to a wide variety of Smithsonian careers. Through the District's Summer Youth Employment Program, 50 CAP graduates from this and past years worked at the Smithsonian during the summer of 1989. In a related effort and in collaboration with Washington, D.C.'s School Without Walls, OESE initiated a program in which high school students publish their own newsletter about the Smithsonian for dissemination to other schools in the area.

In FY 1989, the Office continued to sponsor regional workshops in communities across the United States to promote the use of museums as educational resources. These one-day events in Wilmington, North Carolina; Amarillo, Texas; and Tallahassee, Florida reached an estimated 1,000 teachers and school administrators. In addition, OESE collaborated with WETA to develop a series of teacher's guides to the upcoming season (1989-90) of "Smithsonian World."

The High School Intern Program, now in its 14th year, gave 40 graduating seniors an opportunity to participate in a learning-service program at the Smithsonian,

working behind the scenes with curators and other museum professionals. Young people from all 50 states and the District of Columbia are eligible to apply for admission to either of two five-week sessions.

In July 1989, the Office convened the third annual meeting of the Smithsonian Advisory Council on Education, bringing a panel of seven outside experts to the Institution to advise about developing programs for teenage audiences. In a related effort, the Office convened monthly meetings of education staff from throughout the Institution to discuss issues of common concern. For Smithsonian educators, the Office offered a seminar series on program evaluation in collaboration with the special assistant to the Secretary on institutional studies.

III. National Science Resources Center:

Unrestricted General and Special Purpose Funds - An allotment from unrestricted funds provides partial funding for the core operations of the National Science Resources Center. These resources provide support for salaries and core support necessary for the development, with the assistance of the National Academy of Sciences, of program initiatives to attract further support from the private sector.

INTERNATIONAL ACTIVITIES

INTERNATIONAL ACTIVITIES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	7	791	10	649	-	150	-	58	-	-
FY 1990 Estimate	8	839	10	692	-	150	-	-	-	-
FY 1991 Estimate	15	1,157	10	648	-	150	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The International Center monitors, coordinates, and enhances Smithsonian-wide international endeavors. The Center provides support for the diverse range of Smithsonian international programs through the work of several independent divisions: the Office of International Relations; the International Gallery; the Office of Quincentenary Planning; and the Office of Conference Services. Through the International Center, the Smithsonian also supports international research programs, such as UNESCO's Man and the Biosphere Program and the Council of American Overseas Research Centers.

For FY 1991, the Institution requests an increase of 7 workyears and \$318,000 to strengthen central Institutional support for international relations (1 workyear and \$96,000); to continue pan-Institutional planning for the Columbus Quincentenary (2 workyears and \$100,000); to establish a permanent base of Federal support for the new Office of Conference Services (2 workyears and \$72,000); and to provide program support for the Smithsonian Institution/Man and the Biosphere Program (2 workyears and \$50,000).

PROGRAM - From its inception, the Smithsonian has been an international institution. During the course of the past 140 years, Smithsonian researchers have spanned the globe, forming unique collections and establishing a worldwide network of correspondents and collaborators. Today, the Institution's international activities take place on a number of different levels, from informal scholar-to-scholar contacts to highly structured Institutional programs.

In FY 1985, the Smithsonian established the Directorate of International Activities to advance the global objectives of the Smithsonian's charter by facilitating its international research and encouraging collaborative work abroad. Following an internal program review in FY 1987, the Institution reorganized the various parts of the former Directorate of International Activities into a new International Center in April 1988. A fundamental objective of the Center is to help place the Institution's scholarly work at the service of the general public as it seeks to understand a changing international scene. Located in the S. Dillon Ripley Center of the Quadrangle Complex, the International Center provides facilities for

discourse and exhibitions on a wide array of international matters. Bureau-generated programs fostered by the International Center include conferences, symposia, seminars, exhibitions, lectures, performances, film showings, and workshops. An International Activities Council, composed of the Assistant Secretaries for Research, Museums, Public Service, and External Affairs, provides oversight and policy guidance for the International Center as well as for the broad range of international programs undertaken throughout the Institution.

As part of the reorganization that established the International Center, the Smithsonian created or combined several offices, each of which provides Institution-wide support or coordinating services: The Office of International Relations, the International Gallery, the Office of Quincentenary Planning, and the Office of Conference Services. Responsibility for the individual offices of the International Center is divided among the Assistant Secretaries on the International Activities Council.

Office of International Relations - The Office of International Relations (OIR), which reports to the Assistant Secretary for External Affairs, provides basic liaison support and coordination for the international aspects of Smithsonian research and museum programs. This responsibility includes:

- supplying guidance and information on foreign affairs and international relations;
- facilitating communications and logistical arrangements for research and participation in meetings abroad;
- assisting in drafting and negotiating agreements relating to international cooperative programs;
- assisting foreign scholars and officials who visit the Smithsonian or participate in its programs in the United States;
- compiling and updating the "Profile of Smithsonian International Activities";
- obtaining passports and visas for Smithsonian travelers.

The Office also manages the Smithsonian Special Foreign Currency Program and other international research exchange grants programs.

International Gallery - The International Gallery, which reports to the Assistant Secretary for Museums, presents exhibitions that deal with significant global topics from various disciplinary points of view or cultural perspectives. The first two exhibitions presented in the International Gallery, "Generations" and "Tropical Rainforest: A Disappearing Treasure" illustrate this emphasis. "Generations" explored the richness and diversity of cultures from ancient times to the present as they celebrate the art and rituals associated with birth. "Tropical Rainforests" examined the destruction of the Earth's most biologically diverse habitat, using a cross-disciplinary approach that drew extensively upon research conducted at the Smithsonian Tropical Research Institute, the National Museum of Natural History, the National Zoological Park, and other international research centers.

The third International Gallery Exhibition, "Caribbean Festival Arts" opened in June 1989. Organized by the Saint Louis Art Museum, this exhibition focuses on the arts of three pan-Caribbean festivals: a widely celebrated masquerade commonly known as Jonkonnu, an Islamic festival commemorating the death of Hussein, and the pre-Lenten Carnival culminating in Mardi Gras. Exhibits explore the European, Middle Eastern, and African sources for festival themes, costumes, and accoutrements; the development of these arts in the Caribbean; their present reality in the lives of Caribbean populations; and the diffusion of these festivals to sites such as New York, Toronto, Miami, New Orleans, and London. Public programs related to this exhibition take place in the Caribbean marketplace reconstructed in the open Concourse area of the S. Dillon Ripley Center. The International Center is disseminating information about the exhibition to West Indian communities in particular, which have not routinely visited the Smithsonian.

Office of Quincentenary Planning - The Office of Quincentenary Planning, which reports to the Assistant Secretary for Research, coordinates and supports the development of a wide range of programs at the Smithsonian to commemorate the 500th anniversary of Christopher Columbus's voyages of exploration. For the Smithsonian, this occasion offers an opportunity to take a closer look at the past, present, and future implications of this anniversary. The Institution has promoted the development of a centrally coordinated, pan-Institutional Quincentenary program that will reflect the diversity of Smithsonian research interests and provide the general public with a broad perspective on the significance of the Columbian voyages.

Twenty bureaus and offices of the Smithsonian are planning programs in collaboration with scholars from throughout the United States and abroad. This interdisciplinary and international dimension will highlight the experiences and contributions of all peoples who were affected by Columbus's voyages of exploration. Through these programs, the Office of Quincentenary Planning aims to present an alternative to the traditionally Eurocentric interpretations of the history of the Americas.

The Office of Quincentenary Planning is working with other Smithsonian bureaus, as well as with representatives from native-American, African-American, Hispanic, and other minority communities, to develop educational outreach materials. Currently, the Office is completing the development of educational materials and a game related to the symposium "Ice Age Origins." A series of scholarly and public symposia will continue through 1992, exploring a diverse range of topics related to the European-indigenous encounter. These programs will involve scholars from the Smithsonian, other United States institutions, and Latin America. The Institution will publish symposium proceedings, and, in some instances, Smithsonian staff will develop thematically relevant educational materials for varying grade levels.

In spring 1989, the Institution and the University of Maryland cosponsored a scholarly symposium entitled "Violence and Resistance in the Americas: The Legacy of Conquest." Teachers, professors, students, and the interested public attended the two-day event. In 1990, the Office will sponsor a public symposium entitled "Women in the Americas: Myth and Reality." Planning for future Quincentenary symposia includes a tele-conference that will focus on ecological exploitation and its effects on indigenous populations, using the Andean countries as a case model. The symposium will use satellites to link communities throughout the hemisphere. During 1991, the Office will organize a symposium on the Americas in cooperation with a number of Ibero-American countries. In keeping with its interest in developing outreach activities, the Office is planning a traveling exhibition on ethnobotanical themes. A

collaboration with numerous native-American tribes, the exhibition will circulate to native-American communities across the country. To inform the public about all these Quincentenary activities at the Smithsonian and to provide a forum for discussions of relevant themes, the Office publishes a quarterly newsletter in English, Spanish, and Portuguese.

Office of Conference Services - The Office of Conference Services, which reports to the Assistant Secretary for Public Service, schedules and coordinates conferences and workshops initiated by scholars and staff throughout the Institution. Each year the Smithsonian sponsors approximately 50 professional meetings, ranging from small workshops to major international conferences. For many years, the responsibility for handling all of the logistics of each meeting, from the early conceptual stages through the actual meeting, rested exclusively with the sponsoring research or curatorial department. Faced with these additional duties, the responsible departments or bureaus often found it necessary to hire temporary coordinators. To deal more efficiently with such organizational details and logistical matters, the Institution created a central Office of Conference Services in 1988. This Office now works with sponsoring bureaus, offering the necessary level of support for specific meetings on a case-by-case basis. In FY 1989, for example, the Office handled the logistical arrangements for several dozen conferences, including the Forum on Global Change, the Eighth Triennial Symposium on African Art, and the third annual World Food Colloquium.

Support for International Research - In addition to the new offices established within the International Center, the Smithsonian continues to support other programs in international research under the International Center umbrella. Primary among these programs are the Smithsonian Institution/Man and the Biosphere Biological Diversity Program and the affiliated, independent Council of American Overseas Research Centers.

Smithsonian Institution/Man and the Biosphere Biological Diversity Program - In 1986, the International Center, in cooperation with the National Museum of Natural History and UNESCO's Man and the Biosphere Program, established a new program to formulate biological diversity inventory procedures and administer training in their use. Based on studies and surveys conducted in several protected areas of the United States and Latin America, including the Smokey Mountains of Tennessee, Bolivia, Peru, Ecuador, and Puerto Rico, the program developed an initial methodology for conducting detailed biological diversity inventories of species-rich areas around the world.

Though useful institutional linkages have also resulted from this program, its most important objective is the training of biologists, conservationists, nature reserve managers, and related professionals from developing countries. This training provides researchers in the field of biodiversity conservation from these countries with the skills necessary to conduct their own research. In a number of cases, these trained researchers have later undertaken fieldwork in association with Smithsonian counterpart scholars. This program has organized training workshops for almost 200 participants in several countries of Latin America and the Caribbean, as well as in the United States. The United States Agency for International Development (USAID), UNESCO's Man and the Biosphere Program, the World Heritage Fund, the World Wildlife Fund, and Conservation International have funded training activities over the last three years.

Important goals of the Program in FY 1991 include:

- to provide a team of 16-20 researchers, educators, conservationists, nature reserve managers, and other key individuals from five Latin American countries with basic training in the principles of biological diversity conservation, the management of protected areas, ecology, and related biological research;
- to arrange exchanges of scientific and technical expertise through consultations and training workshops, utilizing regionally or nationally recognized experts;
- to institutionalize these short-term intensive courses in five Latin American countries, so that authorities there may provide their own national, regional, and international training in future years.

Council of American Overseas Research Centers (CAORC) - American overseas research centers are the recognized extensions of the advanced foreign research programs of major American universities and museums. They constitute the channel through which research information about countries important to United States interests invigorates American academic institutions. These centers operate in Italy, Greece, Turkey, Cyprus, Tunisia, Morocco, Iran, Egypt, Jordan, Israel, Yemen, India, Pakistan, and Hong Kong. They provide fellowship funds, access to local research resources, logistical support, liaison with host-country officials, and library and housing facilities to thousands of American academics. The facilities of each center offer contacts for American scholars and their host-country colleagues, and their publication and seminar programs disseminate research results worldwide. The private structure of the centers and the unbiased research they promote make them respected focuses of American academia in the countries in which they operate. As a result, they contribute considerably to a positive United States image abroad.

The Council of American Overseas Research Center facilitates and coordinates the work of its 11-member institutions. Federated in 1981, the existing centers create a forum to identify and address common concerns. CAORC links its member research centers, United States and foreign institutions, and scholars into a global information network. It fosters collaboration among research centers to strengthen academic programs and administrative procedures and sponsors international research projects. The Council undertakes the establishment of new centers in areas where research exchange opportunities are lacking.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Institution requests an increase of 7 workyears and \$318,000 to strengthen central Institutional support for international relations (1 workyear and \$96,000); to continue pan-Institutional planning for the Columbus Quincentenary (2 workyears and \$100,000); to establish a permanent base of Federal support for the new Office of Conference Services (2 workyears and \$72,000); and to provide program support for the Smithsonian Institution/Man and the Biosphere Program (2 workyears and \$50,000).

Central Institutional Support for International Relations (1 workyear and \$96,000) - Over the past nine years, the Smithsonian's international activities have expanded by more than one-third. Exhibitions, staff, and collections travel to or from other countries, and numerous visits or consultations take place each year with foreign officials and scholars. As the international activities of the Smithsonian

increase in number, the public profile of the United States abroad is correspondingly raised.

At the same time, the complexity of providing central Institutional support for international relations has increased. The Office of International Relations a central point of contact at the Smithsonian for foreign museum professionals, scholars, and cultural or scientific officials. OIR staff members arrange diplomatic communications and handle logistical matters; obtain travel, customs, and immigration documents; provide expert advice on how to establish official contacts abroad; assist in obtaining foreign research approvals; and help negotiate agreement for international cooperative programs. To serve the staff and programs of OIR, the Office requests a full-time secretary.

The Smithsonian is responsible for the safety of its staff traveling abroad on official business. With increasing numbers of staff overseas, the Institution must establish international emergency procedures. To provide this support, OIR has identified an experienced commercial firm that will supply evacuation and medical assistance to Smithsonian personnel abroad. The requested funds will permit OIR to contract for the services of this firm.

To maintain and profit from collaborative relationships with foreign counterparts--relationships that are often necessary to retain access to research areas and materials abroad--the Smithsonian must make efforts to share its expertise with colleagues from other countries through such means as training workshops. The requested funds will support and administer training workshops, particularly for foreign collaborators from lesser-developed countries.

Expanded support for the Office of International Relations will enable the Institution to further reinforce its capabilities to support its growing international responsibilities.

Pan-Institutional Planning for the Columbus Quincentenary (2 workyears and \$100,000) - In 1992, the world will commemorate the 500th anniversary of the voyages of exploration of Christopher Columbus. The Smithsonian began planning in 1985 to develop a wide range of programs to commemorate the Columbus Quincentenary. Through these programs, the Institution will contribute to a broader public understanding of the complex issues surrounding the 1492 landfall and the subsequent five centuries of interactions between European and indigenous cultures.

Through the Office of Quincentenary Planning, the Smithsonian is developing long-term collaborative initiatives with Latin American institutions on timely issues of mutual concern. In addition, the Office is working with several Smithsonian bureaus to plan a model program incorporating Quincentenary themes into small traveling exhibitions for distribution to native-American communities.

To assist current staff in the coordination of these activities, the Office requests funds to support a clerk-typist and a research assistant and the development of educational, outreach, and promotional materials.

The Columbus Quincentenary programs will not only commemorate the historic event but also examine the cultural, historical, and scientific implications of the pan-hemispheric encounter. Expanded support for the programs and activities developed by the Office of Quincentenary Planning will enable the Smithsonian to make the Columbus Quincentenary an important contribution to international understanding.

Establishment of Federal Base for Office of Conference Services (2 workyears and \$72,000) - Professional conferences, seminars and symposia, and workshops foster the national and international scholarly exchange of research results in the natural sciences, social sciences, and humanities. As a leading international research institution, the Smithsonian sponsors a large number of these meetings each year.

Conference planning and production require considerable time and effort. Prior to the establishment of the Office of Conference Services, a piecemeal approach to conference planning placed enormous strain on curators and research staff. Large conferences, such as the 1986 National Forum on BioDiversity and the 1987 World Food Colloquium, were particularly disruptive to the normal workload of the organizing offices. Each conference, for example, required part-time assistance of two professional staff members for more than six months and their full-time attention for the three months immediately preceding the meeting itself. In both cases, the organizing offices hired additional staff on a temporary basis.

With the creation of the Office of Conference Services in 1988, the Smithsonian began to establish a professional staff to assist research and curatorial departments in planning and conducting these scholarly exchanges. The provision of centralized Institutional support for conferences will eliminate unnecessary disruptions to research and curatorial work caused by conference planning. In its first year of existence, the Office of Conference Services coordinated ten conferences and received almost four dozen additional requests from curators or professional staff for assistance with meetings. Currently, the full-time staff of the Office consists of two positions, the program director and a program assistant, supported by the Institution's Trust funds. As needed, the Office has supplemented this staff with part-time temporary help.

The Institution believes that the expanding demand for conference services will require additional full-time permanent staff skilled and trained in conference management. For FY 1991, the Office of Conference Services requests a conference coordinator and a conference assistant (2 workyears and \$58,000). These professionals will take responsibility for:

- determining where and when meetings can be held;
- preparing conference budgets and tracking costs;
- booking meeting rooms and accommodations;
- preparing conference schedules, invitations, and programs;
- budgeting and arranging for support services, such as audio-visual and security;
- engaging translators;
- establishing registration systems and tracking registrations;
- recruiting and training volunteers.

In addition, the Office requests \$8,000 for supplies, materials, office equipment, as well as \$6,000 for the printing and reproduction of a Smithsonian Conference

Facilities Guide. As demand for conference services increases, the Smithsonian may need additional staff and funding for this Office.

The establishment of a permanent base of Federal support for the new Office of Conference Services will enable the Smithsonian to continue to foster national and international scholarly exchange and take advantage of the economies of scale inherent in providing central Institutional support in this area.

Program Support for the Smithsonian Institution/Man and the Biosphere Biological Diversity Program (2 workyears and \$50,000) - The Smithsonian Institution/Man and the Biosphere Biological Diversity Program (SI/MAB) provides for the collaboration of foreign natural resource managers and research scholars with Smithsonian staff abroad to obtain a broader understanding of the cultural and biological diversity in their lands. This collaboration encourages training in museum practices, fieldwork methodologies, and biological inventory techniques. Training provides decision makers in developing countries with the knowledge and skills to better manage the conservation of areas of high biological diversity that are essential to the future of mankind. The long-term partnership between Smithsonian and sister institutions in developing countries opens new opportunities for future international cooperation and research abroad.

Though most costs involved in the training activities of the Program are derived from outside sources, the office that plans, administers, and conducts the training program requires adequate staff support from the Smithsonian. In recent years, SI/MAB has grown considerably, along with the expectations international organizations such as UNESCO/MAB, USAID, and the World Wildlife Fund have for it. These and other organizations have provided more than \$250,000 during the last two years to support the SI/MAB Program, and several of them are interested in maintaining or increasing their support in the future. The SI/MAB Program is preparing a detailed seven-year plan which will help secure additional long-term funding.

SI/MAB offers great potential for the Smithsonian to take the lead in an international educational process that will affect a large number of current or future decision makers in countries of concern to the United States. At present, no organization is working to institutionalize an international educational program on this scale. Currently, an interdisciplinary team of national and international experts working through the SI/MAB Program are designing educational modules to meet the specific needs of Bolivia, Peru, Ecuador, and Puerto Rico. During the next five years, this team will design similar modules for ten countries throughout Latin America and the Caribbean.

To support these activities the SI/MAB Program requests these funds to hire a secretary and a program assistant and support travel by Office staff. The new staff will permit this growing Program to continue to provide service at the standards established.

The SI/MAB Program emphasizes joint research and training between Smithsonian and foreign institutions and researchers. Intensive field and museum training encourages international exchange and cooperation with the scientists and institutions of developing countries. As these projects expand, the Smithsonian office that coordinates these activities must obtain funding to maintain basic services.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Allotments provide these funds that support planning and development of research and exhibition programs for the International Center and for administration of Columbus Quincentenary activities. A special purpose fund provides stipend support for international scholarly exchanges aimed at strengthening the Smithsonian's institutional linkages.

Restricted Funds - Restricted funds consist of gifts, grants, and other donations from individuals, foundations, organizations, and corporations for specific purposes, such as undertaking research abroad, supporting exchanges of researchers and collections, mounting exhibitions and staging performances, screening films, and other public presentations in the International Center.

ADMINISTRATION

ADMINISTRATION

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	320	18,098	206	12,645	17	2,898	-	125	-	-
FY 1990 Estimate	356	21,187	215	14,755	17	1,556	-	128	-	-
FY 1991 Estimate	407	26,989	222	15,860	17	1,807	-	129	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Administration includes central management, planning, oversight, and review provided by the Offices of the Secretary, Under Secretary, Assistant Secretary for Administration, General Counsel, and Treasurer. It also covers a wide range of specialized administrative and technical offices, such as Inspector General, Business Management, Government Relations, Equal Opportunity, Facilities Services (responsible for Design and Construction, Plant Services, Protection Services, Environmental Management and Safety, and Architectural History and Historic Preservation), Financial Management and Planning, Accounting and Financial Services, Risk Management, and Sponsored Projects. Other offices in this group include Information Resource Management, Management Analysis, Personnel Administration, Planning and Budget, Printing and Photographic Services, Procurement and Property Management, Special Events, and Travel Services. These units receive both appropriated funds and nonappropriated Trust funds for their operating support in approximate balance to the overall funding of the Institution. However, Trust funds entirely support some offices, such as Business Management, Sponsored Projects, and Risk Management.

For FY 1991, the requested increase for administrative units totals 58 workyears and \$5,327,000. These increases will enable the Institution to strengthen relationships with the Congress and other government organizations (5 workyears and \$312,000), augment the Inspector General function (1 workyear and \$31,000), provide additional legal assistance (1 workyear and \$27,000), and allow for delegated examining authority and other personnel support (9 workyears and \$481,000). In addition, the requested increases will continue the automation of the procurement function (\$53,000), serve printing and video disc development needs (2 workyears and \$54,000), and allow a major expansion of the Institution's automation efforts (24 workyears and \$3,476,000). Furthermore, the proposed increases will strengthen the architectural history function (1 workyear and \$47,000), meet health, safety, and environmental auditing requirements (2 workyears and \$153,000), and improve accounting systems (13 workyears and \$551,000). Also, increases totalling \$142,000, justified in the Uncontrollable Increases section of this budget, will support payroll base deficiencies in the offices of the Treasurer, Inspector General, Equal Opportunity, and Financial Management and Planning.

Decreases of 7 workyears and \$264,000 partially offset the requested increases. These include nonrecurring expenditures in FY 1990 in the Office of Information Resource Management for the personnel payroll system (\$50,000) and in the Office of Accounting and Financial Services related to the new accounting system (7 workyears and \$214,000).

PROGRAM - The Office of the Secretary, with the assistance of the Office of the Under Secretary, is responsible for management and administration. This responsibility includes policy determination, program planning, legislation, and oversight and performance evaluation of activities. The Office of the Assistant Secretary for Administration, with the assistance of the Director of Facilities Services, is responsible for administrative and facilities services.

The Office of the Inspector General (OIG) performs all internal audits and investigates fraud, waste, and abuse, or white-collar criminal activity. OIG audits Federal programs as well as Trust-funded activities. The Office reports audit results and recommends measures to improve program administration. OIG also audits claims, cost proposals, and cost and pricing data arising from contracts, grants, and other financial agreements. OIG investigates allegations of criminal activities by employees or contractors. The results of these inquiries serve as the basis for appropriate administrative, civil, or criminal remedies. OIG staff also investigates areas with the potential for fraud and abuse. The Smithsonian's certified public accountants consider the work of the Office in determining the nature, timing, and extent of their audit procedures. The Institution provides reports on audits and investigations to the Audit and Review Committee of the Board of Regents and to the Congress.

The Office of the General Counsel (OGC) provides counseling to the Smithsonian Board of Regents and the Secretary. The Office also advises other Institutional officers on pertinent legal matters; coordinates and oversees litigation and other adversarial proceedings; and reviews administrative claims arising out of Smithsonian operations. Generally, OGC monitors all aspects of Smithsonian activities for legal implications as new developments in the law affect the Institution.

The Office of the Treasurer oversees financial management and, through the Business Management Office, certain Institutional income-producing activities, including museum shops, mail orders, product development and licensing, and concessions. Financial management duties rest in the Office of Accounting and Financial Services, the Office of Financial Management and Planning, the Office of Sponsored Projects (formerly named the Contracts Office), and the Office of Risk Management. These offices handle accounting, payroll, financial reporting, financial systems development, administration of grants and contracts, insurance matters, Treasury and bank relations, and investment management.

The Office of Government Relations (formerly named the Office of Congressional Liaison), reporting to the Assistant Secretary for External Affairs, develops and maintains the Institution's relationships with the Congress; prepares and clears legislative materials; arranges Smithsonian participation at legislative hearings; and acts as central liaison with Federal agencies and organizations with related interests.

The Office of Equal Opportunity plans, conducts, and monitors a positive action program to ensure equality in employment practices and program activities. Major efforts include affirmative action programs, program and facility access for disabled

persons, employee counseling and complaint processing, upward mobility, special programs for women, Hispanics, Asian Americans, African Americans, and native Americans, and community outreach to minority and women's groups in Washington, D.C., and elsewhere.

The Office of Facilities Services directs a wide range of security, operation, maintenance, and repair programs for Smithsonian facilities as well as safety and health programs for staff and visitors. It oversees modifications and improvements to the physical plant to support growth of programs and activities and conducts long-range planning for facilities development and utilization. Reporting to the Director of Facilities Services are the Office of Environmental Management and Safety (OEMS) and the Office of Architectural History and Historic Preservation (OAHP). OEMS advises and assists Smithsonian bureaus concerning fire protection for their facilities and the National Collections. OEMS also monitors occupational safety and health, including industrial hygiene and hazardous materials control; and reviews, disseminates, and implements the requirements of all new fire, safety, health, and environmental laws, regulations, and standards. OAHP compiles and updates the architectural history of the Smithsonian for research and publication. The Office reviews design and construction projects as they apply to historic preservation regulations to ensure compliance with Section 106 of the National Historic Preservation Act and oversees the Smithsonian Furnishings Collection.

The Office of Information Resource Management (OIRM) oversees planning for automated systems and information technologies; coordinates the Smithsonian Information Resource Management (IRM) program; helps determine information resource management policy; ensures the integrity and security of automated Institutional data; oversees the application of computer and communications technology to the Smithsonian's scientific, scholarly, and management information needs; ensures compatibility among systems; and facilitates user access information systems and computer processing. OIRM acquires, develops, and maintains automated information processing and data communications systems; administers the Smithsonian's data processing cost centers; operates computer systems and voice and data communications networks; and offers pertinent training to users.

The Management Analysis Office provides advisory assistance to Smithsonian administrative operations. The Office studies organizations, systems, and procedures; prepares and distributes management's policy statements and operational guidelines; undertakes a periodic internal controls review of the Institution; oversees the Institution's forms management program; and publishes a biweekly staff bulletin.

The Office of Personnel Administration (OPersA) provides personnel services, advice, and assistance to managers and employees of the Institution. Within the laws and regulatory requirements of Federal oversight agencies and within the policies of the Institution, the Office oversees recruitment, staffing, and position classification; wage and salary administration; performance management and merit pay systems; employee relations; and benefits administration. The Office also is responsible for labor-management relations; training and career development; employee assistance; job and retirement counseling; workers' compensation; unemployment insurance; personnel policy development; personnel management evaluation; and records and data processing and maintenance.

The Office of Planning and Budget (OPB) coordinates Institution-wide long-range planning efforts, advises management on related matters, and prepares the Five-Year Prospectus. The Office formulates the Institution's consolidated Federal and

nonappropriated Trust fund budgets and submits them for review and approval by the Secretary and the Board of Regents. OPB prepares justifications for approved budgets for submission to the Office of Management and Budget (OMB) and to the Congress. OPB serves as liaison with OMB and Congress on budgetary matters. OPB monitors appropriated budgets and nonappropriated Trust fund budgets to ensure that the Institution meets program needs, achieves budgetary goals, and maintains accountability. The Office maintains central financial information data bases for use in management reports, budgetary planning, and special analyses.

The Office of Printing and Photographic Services (OPPS) offers technical advice, guidance, and photography and duplicating services to curatorial, scientific, technical, and administrative staff. Photographic services include studio and on-site photography, photographic copy restoration, printing, preservation of originals under archival conditions, the development and maintenance of an automated catalogue of photographs, the investigation and application of new photographic technologies, and sale of materials to the public.

The Office of Procurement and Property Management (OPPM) provides central logistical support and acquisition policy guidance. This responsibility is achieved through policy, planning, management, and coordination of the procurement, contracting, property management, and supply programs. As the Institution's principal acquisition service, OPPM procures supplies, materials, contractual services, and equipment in support of research and educational programs. OPPM also acts as the Smithsonian's space-leasing agent. In addition, OPPM provides preacquisition policy guidance and administers contracts on behalf of various Smithsonian units. OPPM ensures that the performance of these functions is effective and conforms to Federal and Smithsonian policy, rules, and regulations.

The Office of Special Events (OSE) plans, arranges, and oversees luncheons, receptions, and dinners associated with exhibition openings, seminars, lectures, and meetings. Smithsonian bureaus and offices may sponsor events or cosponsor events with outside organizations. In addition, the Office prepares and distributes a monthly master calendar of special events.

The Travel Services Office (TSO) makes travel arrangements at the lowest possible cost for Smithsonian employees to comply with Smithsonian and Federal travel regulations. The Office enforces the government contract carrier program and the Fly America Act. TSO works closely with other offices to develop and implement new and revised travel regulations and distributes announcements about pertinent changes.

Progress in Administrative and Technical Support - The Institution has placed major emphasis on administrative and support operations to ensure their responsiveness to needs. The following activities during FY 1989 and planned for FY 1990 are noteworthy:

In April 1989, the Institution established the Office of the Inspector General (OIG, formerly named the Office of Audits and Investigations) to meet the requirements of the Inspector General Act Amendments of 1988. During FY 1989, OIG conducted internal and contract audits and investigations of fraud, waste, and abuse affecting Smithsonian programs and operations. Starting in October 1989, OIG will provide semiannual reports to Congress on its audit and investigative activities.

The Institution's diverse programs present a wide range of legal questions and issues for advisement by the Office of General Counsel. In addition to the continuing

need to define the unique legal nature of the Smithsonian Institution in various contexts, the OGC caseload includes evolving areas of the law such as the right of publicity, hazardous waste management, sexual harassment/discrimination, drug testing, AIDS, and repatriation of native-American remains and artifacts. Ongoing matters entail trust law, Constitutional law, intellectual property rights, cultural property laws and treaties, immigration, real property transactions, contracts, labor relations, endangered species regulations, civil rights, employee standards of conduct and ethics, estates, and tax laws.

During FY 1989, the Office of Government Relations (OGR) was involved with legislative activity surrounding proposals for the disposition of native-American skeletal remains and for a National Museum of the American Indian. Taxation and environmental concerns as well as proposals to build an extension to the National Air and Space Museum and to create a National Museum of African-American History and Culture also required attention by OGR. During the first session of the 101st Congress, the terms of two citizen members of the Smithsonian's Board of Regents expired, requiring legislation providing for their reappointment; and necessary resolutions to fill two other vacated seats are under way.

The Office of Planning and Budget (OPB) took action to facilitate an informed and constructive dialogue about the possibility of engaging in Institution-wide strategic planning. OPB, with a small group of central and bureau managers, previewed a series of educational sessions with leading planning experts who had worked with a variety of organizations, including the private sector, government agencies, nonprofit organizations, and colleges and universities. One of these firms is currently working with the Institution to assess the need for strategic planning. The Office refocused the Five-Year Prospectus on programmatic goals and the Secretary's "Areas of Emphasis." This change followed from other improvements to the internal planning process that brought greater focus on broad management and program issues, called for specific planning objectives, and identified a series of planned action steps over the next five years to achieve these objectives. The Office also initiated the development of a new automated Personnel Cost Projection System (PCPS) and issued additional releases to the Smithsonian Institution Budget Manual.

A major priority of the Office of the Treasurer is to improve the centralized accounting and financial systems. The Smithsonian contracted with the U.S. Department of Agriculture's National Finance Center (NFC) to process both its Civil Service and Trust payrolls. The Institution converted to the NFC system in November 1987 and, over the course of FY 1988 and FY 1989, refined this relationship. The NFC system has significantly reduced errors and will improve reporting to bureaus and offices at year-end FY 1989. The Offices of Financial Management and Planning (OFMAP) and Accounting and Financial Services (OAFS) continue to work closely with the Offices of Planning and Budget and Information Resource Management to implement a new Personnel Cost Projection System using NFC data processed by the Institution's new accounting software. Beginning in April 1988, the Institution solidified specifications as a first step in developing a new financial system in response to directives of the Office of Management and Budget. Following a rigorous procurement process, the Office of Financial Management and Planning purchased off-the-shelf accounting software from Walker Interactive Systems. OFMAP, consistent with government-wide efforts, began preliminary work that will lead to conversion during FY 1990 of the Institution's general ledger. The Treasurer initiated steps to strengthen inventory procedures within the merchandising activities under the Office's control as well as administrative oversight in the Office of Sponsored Projects. With the active participation of many bureaus and offices, the Office of Risk Management is pioneering

an institutionalized Disaster Preparedness Program aimed at protecting staff and visitors while securing collections in the event of catastrophe. The new Trust-funded restaurant facility at the National Air and Space Museum opened in August 1988, greatly enhancing public food services.

The Travel Services Office continued to improve the quality and efficiency of the services offered to Smithsonian travelers. Through training and automation, the Office shortened response time for hotel and car rental requests. TSO is working cooperatively with the Office of Accounting and Financial Services in implementing the recommendations of the Office of the Inspector General in the "Report on Audit of the Diners Club Credit Card System" to eliminate the duplication of effort in entering data into computer systems.

The Office of Printing and Photographic Services (OPPS) initiated three projects of national importance. Since it opened almost six years ago, the cold storage facility has become one of the most successful and imitated photographic facilities of its type. A limited expansion in FY 1989 kept pace with the increasing numbers of photographs maintained in the collection. Under a research program in applied photographic preservation, OPPS continues testing new toning solutions to eliminate a suspected carcinogen from Smithsonian photographic laboratories. OPPS modified its testing procedures to include newly developed hydrogen peroxide fuming equipment that will increase the validity of the project results. In its continuing experiments with still video systems for collections management projects, the Office is learning how to adapt photography to a new technology of electronic still imaging. These experiments will offer state-of-the-art techniques for capturing and using collection images for a wide range of applications. The Office recently completed a project with the School of Visual Communications at Ohio University to use electronic images experimentally for newspaper reproduction.

The Office of Information Resource Management (OIRM) implemented new Collections Information System (CIS) data bases within the National Museum of Natural History for the Mammals, Birds, Reptiles and Amphibians, and Botany collections. CIS work is under way on Entomology and Anthropology data bases and the permanent collections of the National Museum of American Art and the National Air and Space Museum. OIRM implemented the first phase of a Generic Report and Search Processor that allows users to define and generate their own reports. A management and registration system for the Resident and National Associate Programs to control scheduling, booking, and charging for Smithsonian events nears completion. OIRM, the Office of the Treasurer, and the Office of Financial Management and Planning supported the acquisition of a new general ledger and budgeting capability for the Institution. This year also saw the implementation of an integrated staff identification, telephone book, and mailing list system; an automated staff "locator" system; and a digital paging system linking the Museum Support Center, the Mall, and the National Zoo. OIRM implemented the first phase of an Institution-wide electronic mail system and completed a study to determine future requirements for data communications throughout the Smithsonian. OIRM will establish data communications service between the Mall and the Smithsonian Tropical Research Institute in Panama by the end of this year. OIRM trained more than 1,100 Smithsonian staff in the use of microcomputer and mainframe systems and handled more than 3,600 computer-related inquiries at its "HELP" desk. The National Museum of American History and OIRM defined functional and data requirements in advance of the migration from the Museum's outdated system to CIS. OIRM initiated a long-term IRM planning process, and established IRM partnerships across the Institution. This new cooperative and comprehensive approach to IRM planning will help to coordinate future budget requests and information systems planning. OIRM also undertook a self-

evaluation effort to assess its ability to meet the needs of the Institution. This effort positions OIRM to fulfill its mission and take advantage of appropriate advances in information technology.

The Office of Procurement and Property Management continued to increase the number, complexity, and total dollar value of transactions processed. Contractors completed installation of new transformers throughout 13 museums to relieve PCB dangers before the Environmental Protection Agency deadline. Final improvements to the Tupper Laboratory and Conference Center in Panama and the Barro Colorado Island research facility are near completion. Contractors will complete the Smithsonian Information Center construction contract in the fall of 1989. The Property Management Program continues to produce savings for the Institution. The Institution better utilized excess property in FY 1989 through a semiautomated excess property recording and review system. Redesigned warehouse space allows more efficient storage and retrieval.

Major activity in the Office of Personnel Administration centered on the study completed by the National Academy of Public Administration, Improving Personnel Operations and Policies. The Institution made some progress in implementing the report's recommendations. Components of the report speak to the efficiency and effectiveness of personnel operations, the responsiveness of the system, affirmative action efforts, and opportunities to be explored, including human resource management.

In FY 1988 and FY 1989, the Office of Facilities Services implemented a more formal goal-setting process to define program direction and provide a framework for strengthening program management and increasing support for the Institution's activities. Human resources and organizational development are key issues, while goals emphasize leadership, cross-development, and training for individual growth of staff members and increased productivity. The Office is working to improve the quality of new hires, with emphasis on attracting minority and women candidates for professional and managerial positions. In addition, the Office is developing management systems for tracking facilities management activities, analyzing program effectiveness, and sharing information within the Facilities Group and with other Smithsonian organizations. The Office has further defined the process for long-range facilities planning and development and has prepared a 20-year plan for construction or acquisition of major new facilities.

The Office of Environmental Management and Safety revised the Smithsonian Handbook on Safety and Environmental Management to expand its scope and current relevance. Additionally, working with the Office of Museum Programs, the Office conducted a three-day workshop for small domestic and foreign museums and other educational and cultural institutions. This unique workshop addressed program development and problem-solving for fire protection, disaster planning, occupational safety and health, and environmental management.

During FY 1989, the Office of Architectural History and Historic Preservation (OAHP) began a research project on the American Art and Portrait Gallery Building and initiated studies for a guide to all Smithsonian buildings. The Office also started a videotape project to record restoration and preservation activities in the Smithsonian Institution Building. The Office organized the architectural records and photographs and augmented those materials with records from the Smithsonian Institution Archives. Members of the staff delivered papers before professional societies, submitted a paper for publication, and supervised the work of graduate and undergraduate students. OAHP has contracted for the reproduction and sale of pieces in the Smithsonian Furnishings

Collection. Royalties on the sale of these reproductions will allow OAHF to make future acquisitions for the Collection.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the requested increase for administrative units totals 58 workyears and \$5,327,000 as follows:

<u>Activity</u>	<u>FTE</u>	<u>Amount</u>
Architectural History and Historic Preservation	1	\$47,000
Environmental Management and Safety	2	\$153,000
General Counsel	1	\$27,000
Government Relations	5	\$312,000
Information Resource Management	24	\$3,476,000
Inspector General	1	\$31,000
Personnel Administration	9	\$481,000
Printing and Photographic Services	2	\$54,000
Procurement and Property Management	0	\$53,000
Treasurer	13	\$551,000
Payroll Base Deficiencies	0	\$142,000

Decreases of 7 workyears and \$264,000 partially offset the requested increases. These include nonrecurring expenditures in FY 1990 in the Office of Information Resource Management for the personnel payroll system (\$50,000) and in the Office of Accounting and Financial Services related to the new accounting system (7 workyears and \$214,000). The \$142,000 increase for payroll base deficiencies is justified in the Uncontrollable Increases section of this budget.

Office of Architectural History and Historic Preservation (1 workyear and \$47,000) - The growing interest in the architectural history of buildings that the Institution holds in trust for the Nation requires increased attention to historic preservation and architectural history issues. The requested increase will also expand publication and education opportunities for the public.

The responsibilities of the Office of Architectural History and Historic Preservation have burgeoned in recent years with the growth of Federal and State historic preservation requirements. Because the Office has no administrative or secretarial support, the present staff of trained specialists must spend large amounts of time engaged in these support tasks. The Office requests an administrative assistant (1 workyear and \$35,000) to provide basic budget, personnel, procurement, and accounting expertise and to coordinate the routine daily activities of the Office as well as to manage the special records and photograph collections. This position will allow members of the professional staff to devote their full time to more substantive research and publication issues.

The remainder of the requested increase will pay for a permanent internship program in architectural history and will provide funds for research documentation leading to publications. An amount of \$4,000 provides stipends for research, publication, and education opportunities through internships with the Office. The remaining \$8,000 begins the publications program documenting the architectural history of the Smithsonian buildings.

Office of Environmental Management and Safety (2 workyears and \$153,000) - The requested increase will help the Smithsonian bring its operations into compliance with laws and regulations protecting facilities, staff, and visitors from safety and environmental hazards. These resources will help assure better environmental

protection, occupational health, hazard communication, radiation and fire protection, and safety training. The Institution requests 1 workyear and \$107,000 to establish an audit program for compliance with all environmental regulations and to manage pollution controls effectively. The program will include periodic surveys at all Smithsonian museums and facilities. These assessments will encourage building and program managers to eliminate environmental deficiencies and improve environmental management practices. Requested funding will permit audits at eight museums or facilities annually by experienced contractors. The expanded program also will educate Smithsonian staff in audit techniques and environmental control methods so that the staff may periodically survey all locations.

An additional workyear and \$46,000 will automate safety and health data to ensure timely and accurate analyses of the Smithsonian's accident and injury experience. Better information will enable safety and other specialists to respond with appropriate hazard prevention measures. The Office of Environmental Management and Safety provides technical and professional support for occupational safety and health. The Office also maintains fire and environmental protection and compiles accident and injury data. The Office now gathers, tabulates, and analyzes such data manually. Automation of this data collection process will ensure effective use of the Institution's safety and health resources and enhance regular and accurate program analyses. The program will publish reports more regularly for management. These reports will show the status of the Smithsonian safety and occupational health program and will lead to an annual report for the Secretary of Labor.

Office of the General Counsel (1 workyear and \$27,000) - The requested increase will enhance the Office of the General Counsel's ability to meet the ever-increasing demand for its services. The caseload of the Office is continually evolving and expanding as a result of new Smithsonian programs and initiatives and developments in the law, as evidenced by the nearly 1,500 items constituting the OGC caseload in FY 1988.

The vast array of legal issues addressed by the Office generates a wide range of legal activities, including contract negotiation, administrative hearings, trial preparation, and claims settlement. The Office requires extensive legal support in the form of legal research, document preparation and processing, and document and file indexing, storage, and retrieval.

The requested increase will add a legal assistant to the staff to aid in the execution of the wide range of operations of the Office and will thereby further the protection of the legal interests of the Institution.

Office of Government Relations (5 workyears and \$312,000) - As an establishment of the Federal government, the Institution must actively inform the Congress of its policies and programs. The requested increase will give Congress, as well as the Administration, greater access to information about operations and programs at the Institution.

For FY 1991, the Office of Government Relations requests three liaison officers, a staff assistant, and a secretary with support costs for staff and participation in the computer informations system, LegisLate.

Congressional review requirements for proposed programs necessitate a thorough and timely presentation by the Institution. As the Institution has expanded existing

and begun new programs, more questions have come from Congress and the Administration. The requested resources will help liaison staff to be more responsive to these questions. In the long term, the public and the government benefit from the knowledge derived from Institutional programs that are promoted and defended by liaison staff. In the short term, the staff extends to the Congress, the Executive Branch, and the public exceptional constituent and information services. Expansion of those functions can be achieved only by additional staff who also will:

- draft proposed legislation and supporting documents;
- meet with Members of Congress and congressional staffs on legislation sponsored by or affecting the Institution;
- confer with government agencies and other common-purpose organizations to coordinate programs;
- disseminate information on the bureaus, their programs and collections.

Lack of support within the budgetary cycle and legislative process result in time delays and service inefficiencies. The requested staff positions and support will enable the Institution to be more responsive to Administration issues and legislative agendas that affect the Institution's status and operations.

Office of Information Resource Management (24 workyears and \$3,476,000) - When the Smithsonian opens its "Information Age" exhibit in 1990, it will be ten years behind in its use of the advanced information technologies on display. Information technologies are tools enabling the Institution, as a national resource, to provide valued research and educational programs. These technologies include computers, computer programs, systems development methods, and communication lines and networks. While the Smithsonian pioneered the use of automation for museums in the late 1960s, it is not keeping pace with technological development. Its first on-line objects collections system, implemented less than six years ago, uses ten-year-old technology. Many of its collections are maintained on manual card and paper filing systems and are inaccessible to scientists, scholars, and the public. Increasingly complex business, education, and research demands for information exceed the capabilities of the Institution's existing technologies. The unique role of the Smithsonian in education and research is in jeopardy. Its attractiveness to researchers worldwide and its status as a focal point of public awareness is diminishing. To reclaim its position as a leader in research, education, and collections, the Smithsonian must utilize appropriate advanced information technologies.

Today's technologies require significant long-term investments to implement and maintain. Private sources for such high and long-term costs are either nonexistent or insufficient. Existing Smithsonian budgets cannot cover the expanding costs. The resulting gap between available resources and rising technology demands and costs creates infrastructure deficits. Addressing these deficits in staff and dollars is critical for the Smithsonian to meet its current commitments. This requires an extraordinary increase in the base budget of the Office of Information Resource Management, the Smithsonian's central office for managing information technologies. The increase is targeted to three areas: services, development, and planning. Services include computing and communications activities that support the automation of and access to information, and telecommunications support. Development includes the design, implementation, and maintenance of Institution-wide computer systems.

Planning includes defining how information technologies can be used to meet established goals.

Services (4 workyears and \$1,040,000): "Insufficient information technology services" is the most critical problem facing Smithsonian information managers. This is the view expressed by attendees at a March 1989 Institution-wide symposium on managing information technologies. Growing user needs for computer and communications support are surpassing available resources in equipment, space, and personnel. Computing demands will exceed available capacity by 1991, requiring substantial upgrades beginning in 1992. Without added capacity, automation initiatives will come to a halt. At the same time, additional communications equipment is necessary to assure adequate communications capacity. Without increases in communication resources, the demand made by construction and renovations projects alone will overload existing capabilities. Finally, the implementation of Smithsonian-wide electronic mail will provide the ability to send and receive information across the Mall and around the world.

Summary of Requested Increases for Services:

<u>Request</u>	<u>FTE</u>	<u>Amount Personnel</u>	<u>Amount Other Services</u>
Computer Center Operations			\$782,000
Electronic Mail	1	\$46,000	\$65,000
Communications Management	3	\$97,000	\$50,000

Development (15 workyears and \$1,640,000): The effective use of information technologies depends on well-developed information systems. Delivering the right data to the right person at the right time and in the right form requires advanced technologies and adequate resources. Smithsonian systems development and maintenance resources do not meet the existing needs described below:

-- The Collections Information Systems (CIS) is behind schedule because of limited resources. Still in its first phase of development, CIS embodies a long-term vision of collections management, research, and public access for Smithsonian collections. In its current phase, with a completion date of 1993, CIS minimally meets user needs.

-- The Smithsonian Bibliographic Information System (SIBIS) is a powerful research utility that, for want of sufficient resources, may have to be scaled back or abandoned. While its current inventory of almost one-half million records is available on the Mall, only new links to national networks can expand SIBIS access to the public. If fully developed, SIBIS will include Smithsonian libraries, bibliographies, inventories of American sculpture and painting, and the Smithsonian Institution archives name and subject indexes.

-- Specialized information systems scheduled to move to the direct control of their users are backlogged. The current target date of 1993 is six years beyond the original estimate for completion.

-- Access to fiscal accounting and human resource information now kept by the National Finance Center is currently unavailable to Smithsonian staff.

Summary of Requested Increases for Development:

<u>Request</u>	<u>FTE</u>	<u>Amount Personnel</u>	<u>Amount Other Services</u>
Institutional Sys. Support	3	\$122,000	\$80,000
Collections Information Sys.	5	\$257,000	\$500,000
Honeywell Conversion	3	\$138,000	\$350,000
Payroll Personnel System	2	\$101,000	
SIBIS Support	2	\$92,000	

Planning (5 workyears and \$796,000): The existing gap between information technology demands and available resources results from annual planning in lieu of long-term plans. To avoid recurring infrastructure deficits, the Smithsonian must define future strategies and develop long-term plans. It must establish a means to keep pace with advancing technologies that account for the cyclical nature of information technologies. Accomplishing this requires an Institution-wide effort to develop a common vision of the future. It is through the recent initiation of a long-term information resource management planning process that the scope and consequences of the current crises emerged. For the first time at the Smithsonian, managers and users of information technologies are forming partnerships to address long-term goals. This process must be supported in its many areas. It includes defining what information is now available and what the information needs are for the future. It depends on identifying the unique and different information needs across the Institution and for public access. It requires a cooperative means of establishing priorities and creating plans for using information technologies that address stated goals. Long-term plans will allow the Institution to monitor computer performance and estimate capacity requirements. Finally, long-term plans will permit the Institution to investigate and select appropriate advanced technologies by applying knowledge of Smithsonian needs and priorities.

Summary of Requested Increases for Planning:

<u>Request</u>	<u>FTE</u>	<u>Amount Personnel</u>	<u>Amount Other Services</u>
IRM Policy Planning	2	\$110,000	\$60,000
Info. Management/Architecture	2	\$119,000	\$115,000
New Database Strategy	1	\$67,000	\$125,000
Capacity Planning	0		\$150,000
Long-Range Systems Plan	0		\$50,000

In order for the Smithsonian to carry out its mission "to increase and diffuse knowledge," it must utilize advances in information technologies. Without sufficient means to automate and access its diverse research, education, and cultural information resources, the Smithsonian cannot achieve its public service goals. Today's and tomorrow's museum visitors and scholarly researchers grew up in the "information age" and are computer literate. Visitors require interactive exhibits and automated public access to the collection, research, archival, and library holdings. The Smithsonian must recover from infrastructure deficits and acquire resources to make optimum use of information technologies. Through the leadership of OIRM, it must increase the level of computer and communications services, improve its delivery of information systems,

and establish a long-term planning process. OIRM can achieve these goals only with the help of public resources.

Office of the Inspector General (1 workyear and \$31,000) - The requested increase will deter criminal activity and other forms of misconduct at the Institution by increasing the expertise of the OIG investigative function. The investigative function addresses a wide variety of technical Smithsonian activities including procurement, financial management, and collections management. Investigations in these areas typically require a high degree of technical knowledge in the financial management field.

OIG auditors supplement the skills of the investigative staff in conducting such investigations when availability permits. With increases in OIG investigative cases, it has become increasingly more difficult to assign audit personnel to the investigative staff and still meet audit obligations.

The requested position for an auditor (1 workyear and \$31,000) to support the investigative staff will enable the OIG to conduct complex investigations and still meet the OIG audit priorities in a timely manner.

Office of Personnel Administration (9 workyears and \$481,000) - The Institution has often lost good job candidates for its various specialized positions because of the length of time involved in the hiring process. To address this situation, the personnel office has assumed delegated examining authority for some of these positions. The requested increase will expedite the hiring process concurrent with efforts to recruit women and minorities in such positions.

The Smithsonian will fill vacancies for about 14 core occupations, including positions in the research, curatorial, and security classifications. The assumption of more delegated personnel authority is in concert with the current policy of the Office of Personnel Management and in accord with recommendations of various study groups, such as the Volker Commission, regarding the need for greater delegation of personnel authority to agencies. With the assumption of this authority, the personnel office will act as an examining agent for OPM and examine for selected occupations peculiar to the Smithsonian. As a result, the Institution will eliminate delays in the examination process and improve coordination between its recruitment efforts and internal placement and promotion programs. It will also attract applicants whose educational and experience backgrounds better match the job needs of the Smithsonian. The Institution requires 5 workyears and \$276,000 to staff this new authority effectively.

Staffing of personnel representatives in OPersA has not kept pace with the growth of the Institution over the past several years, resulting in a slow deterioration of the level and quality of services provided to the Institution and the public. In its May 1989 report Improving Personnel Operations and Policies, the National Academy of Public Administration observed, "A 1987 report by the President's Council on Management Improvement endorsed 1:72 as a government-wide benchmark" for a personnel-to-employee ratio. The Academy cited Smithsonian's personnel-to-employee ratio as 1:92. It further recognized that this "benchmark does not represent an ideal, but is a standard against which to judge the adequacy of OPersA's staffing level when considering a variety of factors." The requested increase of 4 workyears (\$150,000) is a first step in the incremental reduction of this staffing gap and will result in better and more timely service to the Institution and the public.

With its recent partial move from the Arts and Industries Building on the Mall to L'Enfant Plaza, the personnel office consolidated nearly all of its staff and functions in one location. However, some of its staff and functions remain in the Arts and Industries Building, specifically the training room and training staff, the Employment Office, and several staffing specialists. This physical separation is inefficient and inconvenient to both the public and employees. Completing the consolidation of the personnel office will provide a single location where all personnel services can be found and provided. An amount of \$55,000 is sought for the acquisition and preparation of space.

Office of Printing and Photographic Services (2 workyears and \$54,000) - The OPDS Duplicating Branch provides services to the widest variety of Institution bureaus and offices of any service unit. Since FY 1987, the branch has met requirements without increasing staff by introducing high-technology equipment. The requested 1 workyear and \$24,000 will provide staff to operate this equipment at its capacity.

OPDS uses existing resources to place the photographs currently stored in its cold room on video discs. During the last year, however, it has become increasingly important for the Office, and the Institution, to accelerate the production of these discs so that the images they contain can be used in a wide variety of other important programs and activities. The video disc project will also help maintain the archival stability of the original photographs by reducing handling. The Institution requests 1 workyear and \$30,000 to enhance the video disc project.

Office of Procurement and Property Management (\$53,000) - The workload of OPPM continues to increase with the expansion of Smithsonian programs and facilities. For example, the small staff of the Procurement Division handled 3,000 specialized contracts during FY 1989, stretching its ability and productivity to the maximum to meet the Institution's current requirements. The Institution must have an updated and reliable automated procurement system to manage and respond to workload demands.

The requested funding of \$53,000 will upgrade office automation in OPPM. The growth of Smithsonian activities makes automation necessary to control expendable and nonexpendable inventories; record, compile, and report various configurations of contracting data in a timely manner; increase the flow of information between OPPM and requisitioning, receiving, and accounting activities; track the status of requisitions in a more timely manner; and interface with the new Smithsonian-wide financial management system.

Office of the Treasurer (13 workyears and \$551,000) - The requested funding will support the implementation of a new Financial Accounting System that will produce more timely and accurate financial information. The System will readily respond to internal and external audits; it will conform to the Federal Core Financial Management System Requirements and provide information pertinent to Internal Control Systems. By the end of fiscal year 1991, the core of the System will be installed: the general ledger, accounts payable, and financial reporting programs. To ensure that these programs are operating at acceptable standards they must be supported by:

- computer system analysts and specialists, specifically schooled in the software acquired;
- full and accurate documentation of the System;
- a stringent schedule for reconciling accounts;

-- Current accounting policy and procedures.

These essential support functions will make the new Financial Accounting System feasible and provide the means to keep it up-to-date and adaptable to changes in the financial environment.

The new Financial Accounting System will depend upon sophisticated software and hardware and a new communications network. The communications network will gradually expand to financial management users in bureaus throughout the Institution. The requested funding will provide the technical personnel and computer resources needed to facilitate the associated accounting interface with the Institution's mainframe computer and provide the ability to plan and implement changes to the software mandated by regulations or recommended by Management.

The technical personnel will maintain up-to-date **documentation** of the accounting system. The personnel request is for two computer systems analysts and three computer specialists (5 workyears and \$166,000). Additional funds are requested for software (\$50,000) to upgrade the communications network and for equipment (\$60,000) to expand the personal computer user base within the Office of Accounting and Financial Services and the accounting service units located in the museums.

Reconciling accounts is a critical internal control function. The procedure is valuable since it identifies posting errors. Reconciling an account can expose unauthorized transactions and transactions omitted either intentionally or unintentionally. Internal and external auditors are constantly examining the account reconciliations on file in the Office of Accounting and Financial Services. Past and present audit reports reflect inaccuracies in Smithsonian postings that could have been avoided if accounts were reconciled in a more timely and complete manner. Currently, all reconciliations are essentially done by hand. Staff time available to perform reconciliations approximates the same level of 1979, yet the number of accounts and transaction volume have increased eight-fold. The requested funding will provide three accountants (3 workyears and \$96,000), three accounting technicians (3 workyears and \$63,000), and rental space (\$46,000) to operate an account reconciliation program that meets the requisite standards of timeliness, completeness, and audit worthiness.

Maintaining updated **accounting policy and procedures** is a never-ending job. Whether it be creating new or revising the old, extensive analysis of the Institution's financial environment is required to develop policy and procedures that comply with generally accepted accounting and internal control principles. The job is not completed until the policy and procedures are implemented and later tested for compliance. The new Financial Accounting System will require a substantial rewrite of existing accounting policies and procedures. The requested funding will provide two systems accountants (2 workyears and \$70,000) to update present policies and procedures and direct more work hours toward implementing and testing.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Funding of these centralized services from both appropriated and nonappropriated sources produces a ratio of Federal and Trust fund administrative support approximately in proportion to the operating program expenditures of the Institution as a whole. The amounts shown under Unrestricted General represent administrative expenditures for those units that are organizationally under Administration. Other units that receive administrative

allotments appear in the appropriate section of the budget request. For example, administrative costs for the Smithsonian Astrophysical Observatory appear within its nonappropriated Trust funds section. This section also includes expenditures for producing, distributing, and marketing photographic material and slide sets, and funds to help defray the costs of the Office of Printing and Photographic Services. The Office of Equal Opportunity receives a program allotment that supports community outreach through exhibits and publications specifically aimed at women and minorities. Funds also provide for the identification and implementation of new financial and administrative management systems. Special Purpose funds include gifts received through unrestricted bequests that, in accordance with the Bylaws of the Board of Regents, subsequently transfer to the endowment. Anticipated expenditures in the Special Purpose category include support of studies in ornithology, computer conversion costs, a computer cost center, and small amounts used for legal seminars and research.

Restricted Funds - This category includes foundation grants for scientific research publications and general research projects and expenditures against investment income earned on endowment bequests.

FACILITIES SERVICES

OFFICE OF DESIGN AND CONSTRUCTION

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	40	2,504	9	447	-	12	-	-	-	-
FY 1990 Estimate	48	2,933	9	434	-	-	-	-	-	-
FY 1991 Estimate	57	3,671	9	449	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Design and Construction (ODC) provides professional architectural and engineering services to support the development, operation, maintenance, repair, and improvement of the Smithsonian's physical plant. These support services include short- and long-range feasibility analyses, master plans, design and engineering studies, design development, contract document preparation, project management, contract administration, and preparation of cost estimates for budgets and construction. ODC reviews contracts, plans interior design and space renovations, provides technical consulting support, and operates construction field offices.

For FY 1991, ODC requests an increase of 9 workyears and \$738,000 for management and technical costs associated with the enhancement of the Smithsonian's construction and repair and restoration programs, including program management support (4 workyears and \$300,000); facilities planning support (3 workyears and \$323,000); and support for construction and repair and restoration at the Smithsonian Tropical Research Institute (2 workyears and \$115,000).

PROGRAM - The Office of Design and Construction staff consists of electrical, mechanical, structural, and civil engineers; architects; construction and program managers; planners; estimators; technicians; computer specialists; and administrative support positions. The main function of the Office of Design and Construction is to provide the expertise necessary to plan, design, construct, and administer a program for all construction, repair and restoration projects for Smithsonian buildings, museums, and research facilities. The buildings, museums, and research facilities serviced are primarily in the Washington metropolitan area. Other facilities serviced include the Smithsonian Environmental Research Center in Edgewater, Maryland; the Cooper-Hewitt Museum in New York; the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts; the Whipple Observatory in Arizona; the Smithsonian Tropical Research Institute in Panama and Linkport in Florida.

The ODC staff provides professional and technical support to guarantee a safe and proper environment for visitors, staff, and the National Collections. Through the repair and restoration program, the staff works to preserve, repair, rehabilitate, and

correct code violations of an aging physical plant. The staff also provides professional assistance to bureau managers on exhibition construction and space modification projects. These services include:

- providing program management assistance for major museums with construction, renovation, and related needs;
- preparing contract documents including designs, specifications, and cost estimates for construction projects;
- preparing master facility plan studies and related analyses;
- planning for construction and facility development and physical plant utilization;
- developing related budget, construction, and change order estimates for the construction and repair and restoration programs;
- reviewing exhibit designs prepared by museum staffs to ensure compliance with safety, health, and accessibility requirements and compatibility with existing building systems.

The Office maintains an extensive file system of technical specifications and drawings related to facility projects and programs involving all Smithsonian buildings and sites except the National Zoo. This resource supports the current and future work of ODC and other Smithsonian organizations.

Funds committed annually for various facilities and exhibition projects come from construction, repair and restoration, and salaries and expenses appropriations and from Trust funds. Recent major construction, repair, and restoration projects include:

- Construction of the Quadrangle link to the Freer Gallery of Art;
- Additions and alterations to the Freer Gallery of Art;
- Exterior renovation to the Arts and Industries Building;
- Construction of the Tupper Laboratory and Conference Center at the Smithsonian Tropical Research Institute (STRI);
- Major construction at Barro Colorado Island in Panama;
- Construction of the Ridge Dormitory at the Whipple Observatory;
- Repairs to the terrace of the Air and Space Building;
- Construction of the Mathias Laboratory at the Smithsonian Environmental Research Center;
- Exterior and interior repairs and roof replacement for the American History Building;
- Replacement of PCB transformers at all existing locations;

- Removal of asbestos from various facilities;
- Repairs, including fire protection, disabled access, and health and safety improvements for various buildings and museums.

In addition to current activity, ODC planners and design professionals prepared detailed preliminary facility requirements data and planned projects for future years. Detailed plans were prepared for the Whipple Observatory Base Camp construction and the Tropical Research Institute facility development. Preliminary construction plans and projects include the Silver Hill collections storage facility, the Natural History Building utility systems replacement master plan, the Museum of the American Indian planning study, and the Air and Space Building extension site evaluation study.

During FY 1989, ODC's professional staff administered 155 construction service contracts and 85 architectural and engineering service contracts. In addition, the staff reviewed 67 exhibit installation projects and supervised 55 interior design and space-related projects.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, ODC requests an increase of 9 workyears and \$738,000 for management and technical costs associated with the enhancement of the Smithsonian's construction and repair and restoration programs, including program management support (4 workyears and \$300,000); facilities planning support (3 workyears and \$323,000); and support for construction and repair and restoration at the Smithsonian Tropical Research Institute (2 workyears and \$115,000).

Program Management Support (4 workyears and \$300,000) - In addition to its construction requirements, the Smithsonian continues to seek major funding increases to reduce the backlog of essential maintenance and repair work. In FY 1987, the Institution received \$19.0 million for its construction and repair and restoration programs; its request for FY 1991 is nearly \$94.0 million. Staff expansion must keep pace with program expansion to ensure that construction and repair and restoration projects are effectively planned, managed, and executed.

The program management function provides professional planning, architectural, engineering, and construction services to Smithsonian management and major bureaus. Each program manager is responsible for overseeing and managing the total construction program of a specific bureau. Coordination of individual projects from the initial stage of enunciation through final resolve is key to successful completion of a complex program of repairs and modifications in these buildings. The implementation of this function, begun in FY 1988, has improved efficiency and responsiveness in meeting the construction support requirements of the National Museum of American History and the National Museum of Natural History.

With this increase the Office of Design and Construction will expand individual construction management services to other major bureaus. In future years, additional major bureaus in the Washington, D.C. area and other locations requiring construction management support also will benefit from this effort.

The requested increase will support four positions (4 workyears and \$188,000). A program manager will oversee the planning, design, and construction services of a major bureau. An electrical engineer and an architect will develop and oversee project plans and specifications for contracted services. A budget technician will assist in the preparation and processing of contract requests and change order amendments and monitoring of funds availability. Support costs requested (\$112,000)

will provide travel, space rental, printing, supplies, computer equipment and software for these positions.

Without extraordinary attention paid by staff to the specific needs of the Smithsonian facilities and construction requirements there is a risk of equipment and systems failures. Adequate program management support will ensure that closing significant portions of buildings and causing delays in exhibition, collections storage, and research activities will not become a reality.

Facilities Planning Support (3 workyears and \$323,000) - The Office of Design and Construction is responsible for meeting the planning, design, and construction needs of the Institution. The increase will allow ODC to expand its capabilities to identify and predict the costs of resident long-range facilities planning and improvement and major capital development programs. An automated facilities management system will help identify, document, and analyze facilities utilization, space requirements, real estate, operational and maintenance considerations, and new facilities requirements.

The staff requested will develop and implement a central repository of current data of all Smithsonian facilities. This automated system will provide a means for retrieval of all facets of existing facilities for purposes of design, space utilization analysis, contract document preparation, and analysis of space, mechanical, electrical, plumbing, structural, HVAC, and architectural features. In addition, other facilities services organizations will have direct access to this computer system data on a random basis. The system will provide users with current facilities data crucial in planning and directing individual program needs. With this funding, ODC will address short-term needs more effectively, better identify planning needs on a long-term basis, improve long-range costs estimates, and assist management action and decision making.

The requested increase will support three positions (3 workyears and \$102,000). A facilities planner will identify future facility requirements and develop budgetary needs. A cost analyst will develop, review, and analyze data for facilities management. A secretary will enter data and provide administrative support. Other expenses will include computer equipment, software, contracted vendor services, printing, training, supplies, and space rental for the requested positions (\$221,000).

Improved facilities planning will ensure the long-range development of master plans and prospectuses identifying facilities requirements and the presentation of approaches and budget estimates in sufficient detail to permit informed management decisions.

Construction and Repair and Renovation Support for the Smithsonian Tropical Research Institute (2 workyears and \$115,000) - This increase will support the on-site management of the expanded and ongoing construction and repair and restoration programs at the Smithsonian Tropical Research Institute (STRI) in Panama.

The requested increase will support two positions (2 workyears and \$70,000). A construction engineer will oversee the development of planned projects and inspect the work of construction contractors. A secretary will provide clerical and administrative support. These positions will ensure that contractor performance meets Smithsonian standards. Support costs will provide travel, training, equipment rental, supplies, printing, and equipment for the requested positions (\$45,000).

Major construction development has begun at STRI. Congress appropriated more than \$3.6 million for STRI's programs in FY 1989 and is considering a request totaling more than \$3.5 million for construction and repair and restoration projects for FY 1990. It is vital to have on-site staff at this facility, who are familiar with the location and with the ability to oversee the progress for a program of such size.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds provide salary and partial support costs as ODC services both Trust and federally funded programs.

OFFICE OF PROTECTION SERVICES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	751	21,088	-	8	1	80	-	-	-	-
FY 1990 Estimate	757	23,641	-	8	1	140	-	-	-	-
FY 1991 Estimate	797	25,510	-	8	1	140	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Protection Services (OPS) protects the visitors, staff, collections, and facilities of the Smithsonian Institution by providing guard, physical security, and medical services. The authority of OPS to provide these services derives from Public Law 82-206 and Public Law 88-391, both regarding the policing of Smithsonian buildings and grounds, and from Public Law 91-616, which relates to employee health.

For FY 1991, the Office of Protection Services requests an increase of 40 workyears and \$1.869 million to provide guard services for museum summer hours (\$145,000) and correct a base shortage (\$310,000); provide guard services for the Quadrangle (10 workyears and \$224,000) and correct a guard shortage on the Mall (9 workyears and \$202,000); correct a guard shortage at the Cooper-Hewitt Museum (1 workyear and \$22,000); hire guards for the emergency egress system (17 workyears and \$411,000); purchase automated equipment (\$75,000); improve radio communications (\$200,000); purchase a maintenance contract for security systems (\$75,000); hire a medical records clerk (1 workyear and \$22,000); hire an occupational health nurse (1 workyear and \$44,000); hire an employee assistance counselor (1 workyear and \$39,000); and purchase a laboratory and medical services contract (\$100,000).

PROGRAM - OPS is a support organization responsible for protecting the collections, facilities, and other property of the Smithsonian from damage, destruction, or loss from any cause and for creating and maintaining a safe environment for visitors and staff. This broad mission includes a responsibility to:

- determine the protection requirements of Smithsonian facilities and to meet these requirements by operating a guard force;
- procure, install, and maintain an alarm network and to respond to its signals;
- install and maintain locks and other security hardware in Smithsonian facilities;

- investigate activity involving the physical security of property;
- plan and provide health services for employees;
- take appropriate action to eliminate health hazards from the workplace;
- provide emergency medical treatment for the injuries and sudden illnesses of visitors and staff.

OPS provides security management, guard, investigative, and occupational medical services for the major Smithsonian facilities in Washington, D.C., including 14 museums and art galleries, and to the Cooper-Hewitt Museum in New York City. OPS offers technical assistance and advisory services in security matters to all Smithsonian bureaus. To accomplish its mission, OPS employs a force of security officers and a staff of administrators, training specialists, alarm systems specialists and technicians, investigators, museum security specialists, a medical officer, nurses, emergency medical technicians, and an employee assistance counselor.

The security force operates 24 hours a day, every day of the year, to patrol and provide access control at major facilities in or near Washington, D.C., and at the Cooper-Hewitt Museum in New York City. Uniformed guards, plainclothes officers, and K-9 (canine) officers patrol galleries and the grounds around Smithsonian buildings day and night. They respond to emergencies; operate and respond to the signals of an alarm network that covers all Smithsonian facilities, including the National Zoological Park and the Smithsonian Mail Order Center in Springfield, Virginia; conduct security and fire patrols after the museum buildings close to the public; investigate accidents; report fire and safety hazards and malfunctions associated with mechanical and electrical equipment; and provide information to museum visitors. The Office coordinates protection arrangements, especially those related to VIP visits and exhibitions of international interest, in cooperation with the State Department, the Secret Service, the U.S. Park Police, and other Federal and local agencies. In recent years, OPS has concentrated on reducing the number of thefts committed in Smithsonian facilities. Plainclothes officers patrol areas with high crime rates, and OPS intensively trains its officers in police methods and security practices. OPS thoroughly investigates reported incidents, which have increased over recent years (FY 1984, 179; FY 1985, 204; FY 1986, 263; FY 1987, 327; and decreased to 279 in FY 1988).

The training of museum security officers is a specialized area in which OPS takes pride and which has gained renown in the museum community. Training staff instructs all new guards (including K-9), prepares guards for higher-level officer positions, and conducts refresher courses for the force. OPS also trains guards from other agencies and museums. Over the past several years, the staff has trained K-9 teams from Fairfax and Loudoun Counties and Falls Church, Virginia; Kanawha County, West Virginia; and the Annapolis, Maryland, Police Department, as well as guards and guard supervisors from Detroit Institute of Arts; the Museum of New Mexico, Santa Fe; the Virginia Museum of Fine Arts, Richmond; the U.S. Air Force Museum, Wright-Patterson Air Force Base, Ohio; the Amon Carter Museum of Art, Fort Worth, Texas; the High Museum of Art, Atlanta, Georgia; the National Aquarium, Baltimore, Maryland; the Bishop Museum, Honolulu, Hawaii; and other agencies across the United States. OPS assists the Institution's Office of Museum Programs in providing security training for small museums throughout the country. Every year OPS hosts a large museum security conference that has attracted international participants. Through all these activities, OPS plays a leading role in improving the security of cultural objects.

An expansive network of locks, alarms, and other devices is necessary to control access to and provide protection for Smithsonian facilities and property. OPS advises curators and exhibitors on appropriate security systems and plans, designs, acquires, installs, and maintains security systems in Smithsonian facilities in the Washington metropolitan area. In addition, OPS provides advice on security systems for facility, exhibit, and collections protection to Smithsonian organizations outside the Washington metropolitan area and to other museums, libraries, churches, historic sites, and corporations.

OPS developed the Proprietary Security System (SIPSS) to provide complete internal control of the equipment used in and the information provided by its security systems, to improve the timeliness of OPS response to the signals received from its alarms, and to control the costs associated with operating a security system. All Washington-area facilities have SIPSS. Changing field wiring and devices from leased telephone lines to Smithsonian-owned SIPSS will continue through 1989.

OPS conducts and arranges for security management surveys to determine protection requirements of Smithsonian facilities, investigates alleged and actual violations of the law occurring on Smithsonian premises, and escorts shipments of valuable objects to and from the Smithsonian. The investigative program resolves collections losses, thefts, and other serious internal matters. Successful resolution of collections losses and thefts requires coordination with the United States Attorney, the Department of Justice, and the court system.

OPS provides occupational medical services and counseling for Smithsonian employees and emergency first aid for employees and visitors. The medical officer, occupational health nurses, employee assistance counselor, and emergency medical technicians assist in identifying and eliminating hazardous work environments, monitor the health of employees exposed to occupational hazards, and provide first aid for on-the-job injuries of employees. Major program elements include general protection and monitoring of employees exposed to various specific hazards (e.g., asbestos, loud noise, pesticides, and other toxic chemicals); medical evaluation of individuals selected for certain hazardous jobs or for certain job duties or functions (e.g., underwater diving evaluations [73 through June 30, 1989]); employee counseling to deal with substance abuse and emotional problems (470); routine medical treatments (e.g., allergy shots [684], flu shots [559], and dressing changes) requested by an employee's private physician to reduce the amount of work time employees miss for simple health care; required immunizations for Smithsonian employees on official travel (296); health education, major disease-screening programs, CPR training (223 employees), and first aid training (92 employees). OPS provides these occupational medical services at the Washington-area facilities and at major remote facilities as well. There were 11,873 visits to Smithsonian health units in FY 1989. This figure includes services performed by health staff during visits to the remote facilities.

The occupational medicine program has expanded rapidly since April 1983, when OPS appointed its first full-time medical officer. Occupational health units operate in the National Museum of American History, the National Museum of Natural History, the National Air and Space Museum, the National Zoological Park, the Museum Support Center, and the Hirshhorn Museum and Sculpture Garden, and health services are available in other facilities during regular visits by health staff members. OPS has acquired new equipment and developed a new examination program for the increasing number of employees identified as being at risk from exposure to asbestos (444 examinations) and other toxic substances (102) and animal parasites (30). OPS gave

audiometric examinations to employees requiring a hearing conservation program (248) and provided hearing protection devices.

OPS will continue to develop its current occupational health programs and will undertake additional required programs when the space needed to administer these programs becomes available. The programs expected to grow most rapidly are employee counseling, monitoring of employees exposed to toxic chemicals, health-screening tests, and pre-employment physicals. OPS would also like to promote all types of voluntary screening programs to increase employee participation. In FY 1989, OPS health personnel completed 3,326 screening examinations.

A staffing shortage of occupational health nurses has been alleviated by the introduction of special pay rates. A shortage of emergency medical technicians remains a problem for OPS.

In discharging its responsibilities to ensure diving safety, OPS holds meetings with Smithsonian divers to explain the medical standards consistent with those of the American Academy of Underwater Sciences, Undersea and Hyperbaric Medical Society, and the National Oceanic and Atmospheric Administration. OPS reviews medical qualifications of those planning to dive, performs physical examinations of divers, represents the Smithsonian on appropriate committees of national diving organizations, especially with regard to scientific diving, and provides liaison on medical aspects of scientific diving with Federal agencies, legislative committees, and scientific societies. The medical officer regularly visits Smithsonian research sites in the Caribbean to observe and evaluate health hazards for divers.

OPS has expanded its counseling program for employees with alcohol, drug abuse, or emotional problems that affect work performance, bringing the Institution into full compliance with the requirements of Public Law 91-616. The certified counseling staff is available to employees on a full-time basis. The number of referrals is increasing dramatically as this service becomes publicized more widely to employees and supervisors.

An outside contractor is updating the employee medical records system and will complete the extensive computerization in FY 1989. In addition, OPS is now conducting stringent inspections of all Smithsonian and National Zoological Park food service facilities and requires testing all food handlers for tuberculosis.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Office of Protection Services requests an increase of 40 workyears and \$1.869 million to provide guard services for museum summer hours (\$145,000); correct a base shortage (\$310,000); provide guard services for the Quadrangle (10 workyears and \$224,000) and correct a guard shortage on the Mall (9 workyears and \$202,000); correct a guard shortage at the Cooper-Hewitt Museum (1 workyear and \$22,000); hire guards for the emergency egress system (17 workyears and \$411,000); purchase automated equipment (\$75,000); improve radio communications (\$200,000); purchase a maintenance contract for security systems (\$75,000); hire a medical records clerk (1 workyear and \$22,000); hire an occupational health nurse (1 workyear and \$44,000); hire an employee assistance counselor (1 workyear and \$39,000); and purchase a laboratory and medical services contract (\$100,000).

Summer Hours (\$145,000) - The Summer Hours program, mandated by Congress, affords visitors to Smithsonian museums the opportunity to enjoy the museum exhibits for extended hours during the summer months, a peak period for visitors. The Summer Hours

program is especially beneficial to out-of-town visitors who wish to participate in as many cultural activities as possible during their time in Washington, D.C.

The Smithsonian museums are regularly open 10:00 a.m. to 5:30 p.m., seven days a week. During the Summer Hours program, June 15 - September 30, the National Air and Space Museum, the National Museum of Natural History, and the National Museum of American History offer extended hours, opening in the morning at 9:30 a.m. and closing in the evening at 7:30 p.m.

In previous summers, GS-1 aides augmented OPS staff during extended hours by working in the galleries four hours per day. Recruiting problems and frequent turnovers necessitate hiring GS-3 aides to work eight hours per day during extended hours. The requested funds (\$145,000) will pay the increased costs for personnel to staff the museums during the Summer Hours program. The personnel will complement the regular guard force in exhibit halls and galleries.

Base Shortage (\$310,000) - A deficiency in base resources jeopardizes OPS's ability to provide adequate security for Smithsonian property. The current deficiency is the result of increased demand to provide on-site security coverage for construction, repair and renovation projects, before and after normal working hours. Presently, the base deficiency is offset by allowing vacancies to remain unfilled. This practice weakens overall security and affects public accessibility by closing exhibit halls and galleries.

OPS will use the requested \$310,000 to pay overtime expenses to provide security in buildings before and after employees' working hours. By eliminating this base shortage, OPS will be able to provide the necessary security coverage for construction projects in nonpublic areas before and after normal hours.

Quadrangle Guards (10 workyears and \$224,000) and Guard Shortage (9 workyears and \$202,000) - Many factors determine the number of required guard posts. Crowd conditions, value of objects on display, the vulnerability of those objects to accidental damage, vandalism, or theft, and the field of vision of the assigned protection personnel are some of the factors.

The Kiosk, located between the Smithsonian Institution Building and the Freer Gallery of Art on the Mall, provides access to the S. Dillon Ripley Center. OPS based the original request for the Quadrangle guard staff solely on daytime use of the Kiosk entrance. Additional security personnel are required to monitor early morning and late evening activities of staff and class participants. Three additional positions will provide the required coverage seven days a week and allow time for breaks, lunch, leave, and training.

The Enid A. Haupt Garden contains numerous valuable antique benches, urns, and flower stands. These items, though serving a functional purpose, belong to the National Collections. At the same time, the horticultural exhibit in the Garden, representing a typical 19th-century layout, limits the field of vision of a guard on patrol. To keep all areas under continuous surveillance from 7:00 a.m. to 8:15 p.m., the Garden requires two duty posts. Five guard positions will provide coverage seven days a week to the entire Garden.

Eight additional guard positions will provide the necessary inspection tours of the National Museum of Natural History (NMNH) and the National Museum of American History (NMAH) during the hours the museums are closed to the public. OPS guards

conduct these night tours during the second and third reliefs. An additional position for the National Air and Space Museum (NASM) will provide plainclothes coverage in the Museum gallery and shop areas and ensure professional investigation of incidents and offenses that occur in the Museum. These new positions, together with the new positions approved in FY 1989 for the Quadrangle Complex, require supervision. Two new supervisory guard positions will meet this need.

OPS will use the requested funds to hire guards (19 workyears and \$397,000) to post in these critical areas. Other funding (\$29,000) will pay for uniforms, equipment, and necessary support services. With additional security coverage in the Quadrangle Complex and adjacent garden and a reduction of the OPS guard shortage at NMNH, NMAA, and NASM, the Institution will reduce the risk of theft or damage to the National Collections.

Guard Shortage at the Cooper-Hewitt Museum (1 workyear and \$22,000) - The McAlpin-Miller House in New York City houses staff and collections for the neighboring Cooper-Hewitt Museum. The increased use of the facility for staff offices and collections storage requires that the 90th Street entrance be accessible to Museum staff. In compliance with Smithsonian policy, OPS must post a guard at this entrance to control unauthorized access to the offices and collections. All entrances and high-security posts on Smithsonian premises require armed guards.

The 90th Street entrance to the McAlpin-Miller House is the only entrance to the building that can accommodate larger acquisitions. Access to the rear entrance of the McAlpin-Miller House is through the Cooper-Hewitt galleries and outdoor garden. With this configuration, moving the collections between buildings is cumbersome and exposes the objects to the weather. By using the double doors at the 90th Street entrance, trucks can load and unload collections in a sheltered environment and museum staff can transport the collections safely. The Institution requests 1 workyear and \$22,000 to post one guard at this entrance.

Guards for Emergency Egress System (17 workyears and \$411,000) - An effective emergency egress system is essential to the safety of Smithsonian visitors and staff. Currently, some museum exits are locked because there are not enough guards to post them. In the event of an emergency evacuation, an OPS guard must open each emergency door, a process that consumes valuable time during emergencies.

To correct this situation, the Institution will install a new emergency egress system on all doors of each museum. These new locking mechanisms use a time delay switch that will open the door in the event of an emergency but keep it locked at all other times. Pressure on the door release or a central control system will trigger the time delay switch within the lock, and the emergency doors open within 30 seconds. This new system will provide the latest technology in emergency egress systems. In the event of a mass evacuation, the emergency doors will open automatically within 30 seconds of initiation.

While the new system increases the chances for a safe evacuation from the museums, it also jeopardizes, to a degree, the security of the collections. With many emergency exits that the public can unlock (given the 30 second delay), the distances between guard posts and exits, and current staffing level, a person could gain unauthorized access to an exit before a guard could respond to the alarm. These circumstances make it possible for a person to enter the building for illegal purposes or leave the building with illegally obtained property. For the safety and security

of Smithsonian visitors, staff, and collections, security personnel must be able to respond to this emergency system.

The requested funds will pay the costs of 17 museum protection officers. Over the next several years, OPS will request 43 additional guards and \$1,040,000 to complete the posting for the new emergency egress system.

Current emergency exits in the Smithsonian museums are inadequately equipped to accommodate a full-scale evacuation of the buildings. A new emergency egress system with time-delayed locks will allow staff and public to release locked doors in an emergency. While this system has the potential for abuse, the safety of Smithsonian visitors and staff overrides the value of the collections and the cost of the necessary guards to control these exits.

Automation (\$75,000) - The addition of computers in the Smithsonian security offices will increase the efficiency of many daily administrative tasks. Computers will provide faster dissemination of administrative information by network. Other security offices and the Office of the Chief will be able to respond in a more timely manner to routine requests and actions on security matters.

Security guards currently spend valuable time transporting reports on accidents and injuries, guard strength, and museum activities from one security office to another. Using a computer to automate administrative duties and to transmit daily reports via the network to the Office of the Chief would eliminate using guards for this purpose. The chief of OPS will use the computer to edit administrative actions that require his signature. Computerization will also allow the security offices to produce their own letter-quality actions and documents.

The requested funds will purchase computers (\$50,000) and a computer maintenance contract necessary to ensure routine maintenance and prompt response to emergency requests for repair (\$25,000). Regular and routine maintenance on the computer equipment will alleviate unnecessary breakdowns and the expense of replacing the equipment.

Radio Communications (\$200,000) - An Institution-wide radio communications system will permit rapid and direct communications to essential security and plant management personnel. The present constraints of time and channel sharing contribute to unnecessary delays in transmission. A new communications system will provide each guard company with its own radio frequency.

A state-of-the-art radio system will provide dependable, point-to-point communications and eliminate shared frequencies. Currently, all radio traffic to the eight guard companies (employing more than 500 guards) must time-share on a single emergency radio channel. This arrangement results in users having to wait for a free channel on which to transmit. These delays compromise security. In an emergency, communications could become undependable, complicating the efforts to handle the situation.

OPS will use the requested funds (\$200,000) to replace or recrystallize approximately 300 radios. OPS will need an additional \$1.3 million in the future to upgrade communications with new transmitting and repeater equipment, a comprehensive antenna system that will ensure communications in every facility in the Washington metropolitan area, and the hand-held and vehicle-based communications units needed to implement the system.

A new radio communications system will reduce unnecessary delays in transmitting by eliminating shared frequencies. This radio system can establish communications with specific individuals and guard companies in the event of emergencies without the present constraints of time and channel sharing.

Security Systems Maintenance Contract (\$75,000) - Current Smithsonian security systems are outdated, use obsolete equipment that is difficult to replace, and require inordinate attention by OPS maintenance and security crews. Problems with the security system can delay exhibition openings and jeopardize the safety of visitors, staff, and collections. A maintenance contract with an outside specialist will enable the Alarms Maintenance Branch to concentrate its efforts and resources on more efficient planning, operation, and inspection of Smithsonian security systems. An audit by the Smithsonian's Office of the Inspector General (formerly Audits and Investigations) highlighted the need for this maintenance contract.

The OPS Security Systems Division will identify specific security needs for the Institution and address these needs. OPS will use contract services to install and upgrade security systems throughout the Smithsonian. Through contracted services, OPS will replace obsolete equipment and upgrade the security systems with state-of-the-art electronic equipment and security devices. Regular preventive maintenance will reduce operating expenses for the Institution in the long run.

OPS will use the requested funds (\$75,000) to contract the services of a security systems expert. This will provide the services that OPS needs to install and upgrade the Institution's security systems. By contracting out these time-intensive operations, OPS can use its own resources more effectively while ensuring expert attention to the security and safety of Smithsonian visitors, staff, and collections.

Medical Records Clerk (1 workyear and \$22,000) - The Occupational Safety and Health Administration (OSHA) and the Office of Personnel Management (OPM) require government agencies to administer various medical tests to high-risk employees. The number of OSHA- and OPM-regulated programs in which the Institution is involved has more than tripled over the last year and will continue to increase. Additionally, OPM standards require that a medical record exist for all employees whether or not they use the health services of the Smithsonian. OPM mandates that when employees leave the employment of an agency, they are entitled to a copy of their health record. If an employee continues in government service, the new employer must receive a copy of the employee's health record. Even if the employee leaves government service, the health record must be included in the permanent personnel file.

The requested funds will pay the cost of one medical records clerk (1 workyear and \$22,000) to work with the Smithsonian's computerized Medical Records System. The system enables the Institution to meet several Office of Personnel Management standards for record keeping and reporting (5 CFR Part 293). There is a constant need to update information on employees involved in the mandated medical surveillance programs as well as to enter data for on-the-job injuries and illnesses. The addition of a medical records clerk will help OPS maintain and service the computerized Medical Records System. The clerk will ensure the efficient and accurate entry of medical data, the production of printed medical records when employees leave the Institution, and routine updating.

Occupational Health Nurse (1 workyear and \$44,000) - The occupational health of employees is a major concern of the Smithsonian. The Smithsonian has more than 6,000

employees who work over a large geographic area and require on-site medical services. OSHA- and OPM-mandated programs such as diving physicals, hearing conservation, respiratory testing, and exposure to asbestos and hazardous chemicals involve more than 1,000 Smithsonian employees. Effective, appropriately staffed occupational health services are essential for keeping Smithsonian employees healthy and productive in their work.

An occupational health nurse will perform testing on employees. The nurse will use such testing equipment as an audiometer, spirometer, electrocardiograph (EKG), vision tester, and tonometer. The nurse will provide flu and allergy shots, tetanus and rabies immunizations, and travel immunizations and prophylaxis. The nurse also will assist in conducting health-testing programs for parasites, diabetes, tuberculosis, glaucoma, blood pressure, vision, and cholesterol. The requested funds will pay the cost of one occupational health nurse (\$44,000).

An additional health nurse will support the expanding occupational health services that the Smithsonian offers its employees. OSHA and OPM continue to increase required medical surveillance programs related to hazards in the work environment. OPS needs additional nursing staff, trained in occupational health, to provide Smithsonian employees with these new and expanded programs.

Employee Assistance Counselor (1 workyear and \$39,000) - The Employee Assistance Program enables the Smithsonian to provide guidance for employees with problems related to substance and alcohol abuse or with personal difficulties that affect their work performance. This program benefits the Institution by reducing absenteeism and sick leave and by increasing efficiency on the job, thereby increasing employee productivity. An additional employee assistance counselor will contribute toward improving the Employee Assistance Program's effectiveness.

The Employee Assistance Program is a mandate from the Office of Personnel Management (OPM) under provisions of Public Law 91-616. Currently, the counseling staff's workload is full. The addition of a counselor will provide more timely counseling service for troubled Smithsonian employees. With added staff, the Program will be able to train office supervisors to identify and deal with troubled employees, resulting in earlier and more effective referrals.

The requested funds (1 workyear and \$39,000) will pay the cost of one employee assistance counselor who will be available full-time on site for employees to visit. This expansion of the Employee Assistance Program will improve its effectiveness and success in returning troubled employees to optimum levels of work performance.

Laboratory and Medical Services Contract (\$100,000) - In the course of their work, many Smithsonian employees are routinely exposed to hazardous chemicals and environments. More than 1,000 Smithsonian employees are currently involved in high-risk programs for which OSHA and OPM mandate medical tests. Due to the volume of these Federally-mandated tests, OPS must contract for an outside laboratory to conduct laboratory work and medical services.

The contracted laboratory services and other medical tests that support Smithsonian Health Services are necessary for effective occupational health service. Implementing preappointment medical examinations for selected hazardous occupations will increase substantially the volume of examinations and laboratory services that OPS requires.

OPS will use the requested funds (\$100,000) to contract for the requisite laboratory testing associated with preappointment physicals and exposure to asbestos, formaldehyde, and other hazardous substances. OPS will need additional funding in future years as the Institution adopts more Federally-regulated programs and as the Institution identifies more employees affected by these programs.

These new and expanded occupational health programs will limit occupational injuries and illnesses, thus keeping Smithsonian employees healthier and more productive and minimizing work-related compensation claims. Laboratory tests are a necessary part of these Federally-mandated programs.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - The use of guard services at after hour special events and lectures at Smithsonian facilities provides allotments and reimbursements. These funds purchase supplies, materials, and equipment.

OFFICE OF PLANT SERVICES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1989 Estimate	500	37,496	6	964	1	92	-	-	-	-
FY 1990 Estimate	503	41,822	6	1,214	1	162	-	3	-	-
FY 1991 Estimate	528	43,872	6	1,235	1	165	-	2	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Plant Services (OPlants) operates, maintains, and repairs 14 museums and art gallery buildings and many other work and collection storage areas located in the Washington metropolitan area and New York City. In support of research, exhibitions, education, and other public programs, OPlants provides utilities, transportation, mail services, exhibits renovation, and other program services. OPlants also provides technical service and assistance to several Smithsonian units located outside the Washington metropolitan area, including the Smithsonian Tropical Research Institute in Panama, the Fred Lawrence Whipple Observatory in Arizona, and the Smithsonian Environmental Research Center in Edgewater, Maryland.

The Office of Horticulture, South Group Facilities Management, and Quadrangle Facility Management are also part of this line-item. The Office of Horticulture manages the Smithsonian grounds and provides horticultural assistance to Smithsonian bureaus. A greenhouse-nursery supports the horticultural needs of the Smithsonian. Lectures, seminars, and horticultural exhibitions constitute educational outreach. South Group Facilities Management offers a full range of maintenance services for the Arts and Industries Building and Smithsonian Institution Building. Quadrangle Facility Management offers a variety of administrative and maintenance support services for the Arthur M. Sackler Gallery, the National Museum of African Art, and the S. Dillon Ripley Center, located in the Quadrangle Complex.

For FY 1991, the Office of Plant Services requests an increase of 25 workyears and \$767,000 to enhance facilities management (6 workyears and \$183,000); support automation of administrative management systems (2 workyears and \$159,000); and initiate a transportation safety program (1 workyear and \$33,000). Funds are also requested to improve daily grounds and plant maintenance for the Office of Horticulture (2 workyears and \$100,000); provide buildings and exhibit maintenance support to South Group Facilities Management for the new Experimental Gallery in the Arts and Industries Building (4 workyears and \$76,000); and provide Quadrangle Facility Management with support services for the S. Dillon Ripley Education Center (10 workyears and \$216,000).

An increase of \$1,363,000 justified in the Uncontrollable Increases section of this budget will support the Institution's utilities and rent.

PROGRAM - I. Office of Plant Services: With base funding of 372 workyears and \$15,389,000, the Office of Plant Services operates, maintains, and repairs more than five million net usable square feet in museums and art galleries in Washington, D.C., and New York City. The Office provides maintenance of building interiors and exteriors; elevators, escalators, mechanical, and electrical equipment; and lighting and refrigeration components, as well as oversight of emergency property repairs accomplished by service contracts. Trade and craft support includes plumbing, electrical, woodcrafting, and plastering efforts. In addition to furthering research projects and office relocations and modifications, OPlantS provides these services to support exhibition installations and public events throughout all Smithsonian facilities.

The Office's automated Facility Monitoring System continually analyzes and controls mechanical equipment throughout the Institution. This system monitors areas of buildings requiring stable humidity and temperature control and alerts a control center when deviations from normal conditions occur. Because this automated system identifies abnormalities so quickly, immediate adjustments allow the Smithsonian to avoid costly repairs and prevent damage to the National Collections. The automated Preventive Maintenance System ensures increased reliability, decreased repair costs, and longer life by scheduling regular preventive maintenance on building operating systems. This system schedules preventive maintenance for fire prevention systems, guard stations, and automatic lighting, as well as roofing systems and heating, ventilating, and air conditioning systems in all museums and the Smithsonian Environmental Research Center (SERC).

The Office maintains and operates a supply warehouse to stock and distribute frequently used supplies and materials. To obtain the best prices, OPlantS purchases materials in bulk and stores them for future distribution. In addition to supporting office relocations and modifications, OPlantS offers packing, crating, warehousing, and moving services for museum objects and collections. The Office also provides a full range of transportation services for the Institution, as well as mail services and postage monitoring.

In FY 1989, OPlantS continued providing program support to museums and other Smithsonian organizations. This support included preparing halls for new exhibitions, renovating office space to accommodate changing program needs, and continuing the installation of automated exhibit lighting systems. The building inspection program continued, ensuring identification and disposition of facility repair needs by OPlantS personnel.

Significant accomplishments in FY 1989 included providing trade and craft services such as electrical, plumbing, woodcrafting, and painting in support of more than 90 exhibits projects. Notable among these exhibits were "Crossroads of Continents" at the National Museum of Natural History; "Caribbean Festival Arts" at the International Gallery in the Quadrangle Complex; "Beyond the Limits: Flight Enters the Computer Age" at the National Air and Space Museum; "Ceremonial Court" at the National Museum of American History; and "Gerhard Richter" at the Hirshhorn Museum and Sculpture Garden.

Other significant OPlantS accomplishments were installing playground equipment for the Smithsonian Early Enrichment Center, completing construction of the new

Mathias Laboratory at SERC, providing assistance to the Inaugural Committee for the Inaugural Ball and other activities held at Smithsonian facilities, and receiving an award from the Potomac Electric Power Company in recognition of outstanding contributions in support of the annual electrical Load Curtailment Program.

II. Office of Horticulture: With base funding of 46 workyears and \$1,782,000, the Office of Horticulture (OH) applies the discipline of horticulture in educational, scientific, research, exhibition, and display activities throughout the Smithsonian. OH manages the grounds and gardens surrounding 14 museums and support facilities on the Mall and elsewhere in the Washington metropolitan area to ensure healthy, safe, and attractive landscaped areas. The Office also manages the Mary Livingston Ripley and Enid A. Haupt Gardens, which provide a respite to visitors and serve as horticultural educational exhibitions.

OH manages landscaped areas. Staff responsibilities include turf management, tree and shrub feeding, disease and insect control, condition monitoring, and the watering of hundreds of trees, shrubs, and innumerable flowers in exhibition gardens and landscaped areas. More than 100,000 plants and artifacts are under OH's management, including garden furniture and plants grown at the Smithsonian greenhouse-nursery complex at the U.S. Soldiers' and Airman's Home that are used in Smithsonian museum interior and exterior displays. OH units extensively use resources within the Horticulture Branch Library to support these programs. Removal of ice, snow, and trash from the gardens is also the responsibility of the Office.

In FY 1989, work continued to improve the soil in the Enid A. Haupt Garden (EAHG). The compacted soil was lightened by using organic amendments and introducing 20,000 earthworms and earthworm casings. Seasonal plantings in EAHG provide continual enjoyment to visitors. Review of walkways improvements for wheelchair access continues. The 100-year-old European linden tree, a focal point in the EAHG, was blown over during a windstorm. Five linden trees planted in a semicircle around the Downing Urn replaced it.

OH continued to work with the Office of Product Development and Licensing (OPDL) on reproduction and marketing of OH Artifact Collection items. OPDL contracted with Garden Source, a garden furnishings manufacturer, to produce two small 19th-century urns and a 19th-century flower stand, also being offered as a fountain. OH also worked with OPDL on a jigsaw puzzle made from images of seed packet covers.

In FY 1989, the Office of Horticulture provided significant numbers of plants used in exhibition projects within the various Smithsonian museums. Among these exhibitions were "Flowers from the Royal Gardens of Kew" at the National Museum of Natural History and "Caribbean Festival Arts." During the year, seven changing exhibitions in the north foyer of the National Museum of Natural History were installed. These included tropical plants, ivies, ferns, bromeliads, ornamental grasses, poinsettias, and cymbidiums. OH distributed fact sheets with cultural requirements and bibliographies at each exhibition. OH provided special plants for the Hawaiian display at the Festival of American Folklife. OH placed first in the Institutional Class of the National Capitol Orchid Society exhibition for the "Best Exhibit" in the show.

During December 1988, OH mounted the 12th annual "Trees of Christmas" exhibition in the National Museum of American History. OH staff displayed thousands of hand-crafted ornaments on twelve trees, each portraying a different theme and craft. Volunteers from throughout the United States made ornaments from natural and

manufactured materials, then donated them to the Institution at the conclusion of the exhibition.

III. South Group Facilities Management: With base funding of 41 workyears and \$1,183,000, South Group Facilities Management responds to the needs of the two oldest and most historic buildings of the Smithsonian: the Arts and Industries Building and the Smithsonian Institution Building, known as the Castle. The staff is responsible for cleaning, minor maintenance, labor services, lamping, craft services, shipping and receiving, and special events. The Office also contracts for and coordinates maintenance, trash removal, pest control, and renovation projects.

IV. Quadrangle Facility Management: With base funding of 44 workyears and \$1,065,000, Quadrangle Facility Management provides a wide variety of support services to the Education Center of the S. Dillon Ripley Center, Museum of African Art, Arthur M. Sackler Gallery, Resident Associate Program, National Associate Program, Smithsonian Institution Traveling Exhibition Service, and the International Center. These services include space-scheduling and custodial, labor, rigging, minor maintenance, lamping, shipping and receiving, and other services. The automated scheduling and maintenance program greatly enhances the reliability and effectiveness of housekeeping, public events, and related support services.

EXPLANATION OF PROGRAM INCREASE - For FY 1991, the Office of Plant Services requests an increase of 25 workyears and \$767,000 to enhance facilities management (6 workyears and \$183,000); support automation of administrative management systems (2 workyears and \$159,000); and initiate a transportation safety program (1 workyear and \$33,000). Also requested are funds to improve daily grounds and plant maintenance for the Office of Horticulture (2 workyears and \$100,000); provide buildings and exhibit maintenance support to South Group Facilities Management for the new Experimental Gallery in the Arts and Industries Building (4 workyears and \$76,000); and provide Quadrangle Facility Management with support services for the S. Dillon Ripley Education Center (10 workyears and \$216,000).

I. Office of Plant Services Facilities Management Program (6 workyears and \$183,000) - Additional resources directed to the Facilities Management Program will result in increased attention to maintenance and building repairs, ensuring long-term preservation of all Smithsonian facilities, more energy efficient operations, and more accurate environmental control for the Institution's aging physical plant. Additional benefits of this Program will include improved public appearance, a safer environment for visitors and staff, better control of facilities costs and services, and increased vehicle safety.

Funds requested for FY 1991 will support the second phase of a five-year program, started in FY 1989, of facilities maintenance and repair. OPlantS will hire a computer specialist and a data entry clerk (2 workyears and \$55,000) to support the automated Preventive Maintenance System. Lacking computer expertise, the Institution has had to depend upon contracts to support its automated Preventive Maintenance System. The in-house maintained system will provide more accurate and timely feedback to managers and supervisors. An electrical engineer (1 workyear and \$38,000) will ensure that the design and operation of electrical systems in existing facilities are energy efficient. This engineer will also assist in the annual inspection of all Smithsonian buildings. Finally, the resources will provide three additional maintenance mechanics (3 workyears and \$90,000) to begin necessary repairs more quickly, lessening the chances of much larger, and more expensive, repairs in the future.

Administrative Management Systems (2 workyears and \$159,000) - The addition of an administrative assistant and one computer specialist (2 workyears and \$59,000) to support administrative automated systems in the Office of Plant Services will help maintain vital automated activities such as project scheduling, maintenance service order status, reimbursements, accounting, and personnel management. They will also assist in developing new automated systems applications; maintain an inventory of hardware, software, and computer component equipment; determine solutions to information management requirements; and locate and eliminate problems relating to computer programming. The funds will also provide \$100,000 in additional base funding for computer replacement and upgrading and system enhancement and expansion.

Transportation Safety Program (1 workyear and \$33,000) - An additional automotive mechanic will be responsible for performing periodic safety inspections of Smithsonian vehicles while they are in use and will also assist in accident investigations to help determine whether vehicle maintenance or conditions were contributing factors in the accident. The Smithsonian implemented an annual preventive maintenance program to insure proper maintenance of its vehicles. However, periodic inspections of these vehicles between scheduled maintenance is important for the safety of all Smithsonian employees.

The workyears and funds requested for FY 1991 will improve overall efficiency and increase the Institution's ability to provide the maintenance and repair services needed for the more than five million square feet of Smithsonian facilities and 150 vehicles that currently constitute the Smithsonian fleet.

II. Office of Horticulture:

Daily Grounds and Plant Maintenance (2 workyears and \$100,000) - The requested resources will augment primary daily care of the 42 acres of Smithsonian grounds under the Office of Horticulture's care and provide supplemental support to exhibition gardens.

The Enid A. Haupt Garden (EAHG) can serve as an example of the complexity of care required by OH staff. EAHG is a rooftop garden, with multiple microclimates and varying cultural requirements, which requires 56 hours per week watering and grooming hanging baskets, 40 hours per week raking gravel in walkways, 32 hours per week cleaning out fountains, and 72 hours per week (twice weekly) mowing. The trees, shrubs, and flowers also require intensive care.

Currently, OH has 34 gardening staff (permanent and temporary) providing care to the grounds and greenhouse operations. The ideal combined gardening staff levels for the Grounds Management Division and Greenhouse Nursery Division is 55. In comparison, the National Gallery of Art has a staff of 12 full-time gardeners to serve two linked buildings with adjacent greenhouses and about seven acres of turf and landscaping with no special gardens.

The two gardeners (2 workyears and \$60,000) requested for FY 1991 will augment the Grounds Management Division and provide necessary supplies and equipment (\$40,000).

III. South Group Facilities Management:

Buildings and Exhibit Maintenance Support (4 workyears and \$76,000) - The Arts and Industries and the Castle buildings have an annual visitor count of nearly 2.5

million. When the new Visitors' Information Center opens in the Castle in fall 1989, it will welcome an estimated three million visitors a year. Moreover, it will open to the public at 9 a.m., one hour earlier than Smithsonian Museums. Visitors will be able to see films and use automated information systems to learn about Smithsonian-related programs. Tour and travel organizations will bring their groups directly to the new Center. The required housekeeping resulting from these levels of visitors will be extremely demanding.

In addition, a new Experimental Gallery is slated to occupy two exhibit halls in the Arts and Industries Building in FY 1991. South Group Facilities Management will be responsible for maintenance of this exhibit, occupying approximately 13,000 square feet. Exhibit maintenance is not now a responsibility of South Group. The interactive nature of the exhibit will require a high level of maintenance. This exhibit will change twice a year and will require considerable labor support during times of installation and removal. Exhibit installation is another function not currently performed by South Group.

Current staff cannot maintain the existing nonpublic areas of the two buildings, including the new Infant Care Center and new Health Unit (both to open in FY 1990), as well as the new Experimental Gallery and the high-traffic areas of the newly renovated Visitors' Information Center, without a severe reduction in the level of maintenance provided.

The requested workyears and funding for FY 1991 will help ensure prompt building maintenance services for those facilities under South Group's care, the performance of new exhibition-related functions, and a pleasant, comfortable environment for staff and the many visitors to the Smithsonian.

IV. Quadrangle Facility Management:

Support Services for the S. Dillon Ripley Education Center (10 workyears and \$216,000) - Based on two years of operations in the Quadrangle Complex, Education Center events will continue to generate a higher level activity than expected in earlier planning. In order to meet this higher than expected demand, the Quadrangle Facility Management requests additional staff.

The Education Center of the S. Dillon Ripley Center, located in the Quadrangle, provides classroom and lecture hall facilities for educational programs and other meetings. It is a multi-user meeting location, with frequent changes required in room arrangements and thus frequent demand for building management services. For example, during calendar year 1988, various offices held 5,000 events at the Education Center and adjacent areas, including the Concourse.

During 1989, this active schedule has continued, with the total number of events to be held in the Education Center estimated to be 7,000. These events range from craft, art, photographic, and cultural presentations to specialized programs on art, music, history, and conservation. These events are well attended. For example, during the exhibition "Tropical Rainforests: A Disappearing Treasure," the International Center sponsored a "Family Day" in the Concourse, attended by 10,000 people.

When planning the initial staffing requirements for the Quadrangle Facility Management, the Smithsonian did not include additional staff to support the then projected low-maintenance requirements for the Education Center. Furthermore, the

initial projections of staffing assumed a shorter daily public schedule (from 10:00 a.m. to 5:30 p.m.) than the facility is actually used. During FY 1989, Quadrangle Facility Management met the higher demand for its services by using overtime, deferring some lower priority requests, and reassigning some tasks to the program bureaus located in the Quadrangle Complex.

For FY 1991, the Quadrangle Facility Management requests an increase of 10 workyears and \$216,000 to hire nine laborer positions (9 workyears and \$180,000) to support the growing demand of building management services for the Education Center. An events scheduler (1 workyear and \$25,000) will coordinate a work schedule and process the paperwork required for scheduling room setups. Remaining funds will provide supplies and materials and other services costs, including Quadrangle signage needs.

In addition to the actual classroom and lecture hall facilities in the Education Center, the Concourse has become a focal point for an increasing number of large public events because of its size and location between the Education Center and the International Gallery. Quadrangle Facility Management strives to support these activities with the highest level of efficiency in order to ensure that each visitor leaves with a positive lasting impression.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Allotments provide unrestricted Trust funds to cover salaries and support costs in the Office of Plant Services. These allotments also provide the Trust-fund share of space rental costs for administrative activities located at L'Enfant Plaza. Reimbursements from Trust-funded client organizations provide special purpose funds for support services offered by OPlantS. These funds purchase supplies, services, equipment, and landscaping materials.

CONSTRUCTION AND IMPROVEMENTS
NATIONAL ZOOLOGICAL PARK

1989 Appropriation.....	\$5,305,000
1990 Estimate.....	\$6,500,000
1991 Estimate.....	\$19,100,000

Appropriations to this account provide funding for:

- repairs, alterations, and improvements to plant property;
- additions to existing facilities and minor new facilities, including exhibits;
- plans and specifications for construction;
- renovation, restoration, and construction of new facilities outlined in the Master Plan initially approved in FY 1973 by the Fine Arts and the National Capital Planning Commission and approved after revision in 1986.

The Zoo contracts for most construction and improvement projects. If the contractor's estimates are above acceptable cost levels, a more economical alternative is to hire permanent or temporary labor to accomplish the work. The account also funds related expenses such as relocation of animals during the renovation or construction of facilities and major grounds maintenance resulting from storm damage.

In keeping with the 1889 charter, the National Zoological Park endeavors to "administer and improve" the Zoo for "the advancement of science and instruction and recreation of the people" (20 U.S.C. 81). The National Zoological Park (NZP) complex includes 163 acres in the Rock Creek Valley of Washington, D.C., and a 3,150 acre Conservation and Research Center (CRC) located in Front Royal, Virginia. Since 1890, exhibition and public educational functions have been centered in the Rock Creek Valley portion of the National Zoological Park. Conservation, research, and breeding functions take place at both Rock Creek and the Conservation and Research Center at Front Royal. Since 1975, CRC has assumed primary responsibility for saving threatened and endangered animal species.

ROCK CREEK MASTER PLAN - The National Zoo's Rock Creek facilities undergo major renovations and improvements through implementation of the Master Plan. The Congress has appropriated a total of \$53,330,000 over the period FY 1974 - FY 1989 to carry out major portions of the Master Plan. Full implementation of the Master Plan, as revised in 1986, will place the National Zoological Park among the world's finest zoos.

Smithsonian Tropical Science and Global Environmental Science Gallery (\$4,500,000) - As an extension of the Amazonia Exhibit, the Zoo proposes to construct the Smithsonian Tropical Science and Global Environmental Science Gallery to educate and inform visitors about tropical biology and global problems. This 8,000-square foot space will consist of 6,000 square feet of exhibit space and 2,000 square feet of support and office space. The exhibit area will be constructed as flexible-use gallery space.

This expanded component of the Zoo's Amazonia Exhibit will showcase the complexity of interactions among plants and animals. The Gallery will spotlight the exquisite nature of the little things that make the tropical ecology work. Exhibits will provide closeup views of the complex web of partnerships and competition that

exist among plants and animals. In the Gallery, visitors will explore the myriad of specialized adaptations and relationships that the rich tropical environment nurtures.

The Gallery will also serve to inform visitors of the global environmental effect of the destruction of tropical rain forests. NZP will use the Gallery to explore topics such as the greenhouse effect, global warming, and satellite monitoring. In the area of conservation, the Gallery will emphasize creative alternatives to forest destruction and the rising commitment to preserve these priceless natural riches. The Gallery will address such subjects as how indigenous people use and live with the forest, the forces threatening the forest, the impact of destruction, initiatives for responsible development, and suggestions for what each person can do to save the rain forests.

The Smithsonian Tropical Science and Global Environmental Science Gallery will be a major step forward in zoo exhibitory, setting an example of how new techniques of information transfer apply to a zoo setting. Visitors will learn a new way of looking at nature and will leave with a heightened sense of appreciation for the remarkable tropical ecosystem and the need to conserve it.

Aquatic Trail (\$6,000,000) - The Aquatic Trail will consist of a cluster of exhibits near the Zoo's Amazonia Exhibit. The exhibit will include the addition of two widely popular groups of animals, sea otters and penguins, that are the focus of important conservation messages. Within the Aquatic Trail exhibits, the Zoo will highlight four habitats: the American Lake, the South Atlantic Coast, the Chesapeake Marshes, and the Mangrove Swamp.

The American Lake Exhibit will provide an underwater view of a prototypical inland lake in the eastern United States. Interpretation will focus on the response of plants and animals to temperature stratification in lakes; the food chain; interaction within schools of fish; and communication among fish.

The South Atlantic Coast Exhibit will display a habitat from the southern hemisphere that will include a small colony of black-footed penguins and prey species. The interpretation will emphasize the adaptations of these unique seabirds and their similarities to marine mammals which have a parallel lifestyle.

A replica of a portion of Chesapeake Bay marshes and shoreline areas will provide a walk-through habitat that explains issues of local concern. Utilizing familiar avian and aquatic species, this exhibit will focus on ecological balance and threats to the Bay's animal life.

The Mangrove Swamp Exhibit will serve as a possible transition from the mouth of the tropical river or stream that is contained in the neotropical forest area to the exhibits of the Aquatic Trail. It will stress the land-forming role of mangrove trees and the novel lifestyle and adaptations of the various species that inhabit a mangrove swamp.

Olmsted Walk Landscaping (\$935,000) - With funds provided in FY 1989, the Zoo is completing renovation of the main walkway from its Connecticut Avenue entrance to the entrance off Rock Creek. With funds requested in this justification, the Zoo will improve landscaping and green spaces bordering the Walk.

The proposed horticultural program for Olmsted Walk will enhance the visitors' understanding of plants and their relationship with animals and man by focusing on

such issues as the economic use of plants, rare and endangered plants, and habitat destruction. The program will also serve as the framework for the Zoo's conversion to a BioPark.

Loop Trail Graphics (\$300,000) - The Olmsted Walk renovation project established a clear pedestrian walkway through the center of the Zoo. Although this main route connects most of the Zoo's exhibits, it bypasses the Bird House, with its new Wetlands Exhibit; the exhibits in Beaver Valley; and the Zoo's new Aquatic Habitat complexes. The Loop Trail Graphics project will connect these exhibit areas with the main Olmsted Walk and provide for the graphics necessary to support the transformation.

Hall of Humankind Design (\$300,000) - To enhance its animal husbandry standards, the Zoo has made remodeling the Monkey House, constructed in 1906, a priority. Accordingly, the Zoo is requesting design funds for a Hall of Humankind to replace the outdated concept of a monkey house. The new facility will treat the biology of the primates in an innovative manner by looking at human origins, biology, and cultural achievements in this context. Paralleling and complementing exhibits on human origins in the National Museum of Natural History, the Zoo's exhibit will use living animals such as tool-using capuchin monkeys, language- and drawing-capable apes, orb-weaving spiders, leaf-cutting ants, and honeybees as analogues of the social, technological, agricultural, communicative, and artistic accomplishments of humans.

The actual construction of this new facility will start in FY 1992, at an estimated cost of \$3,000,000.

CONSERVATION AND RESEARCH CENTER DEVELOPMENT PLAN - The construction strategy at the Conservation and Research Center is to develop an infrastructure that will serve equally well any of the major functional paths that the Center may follow in the next 20 years. All projects conform to the Center's Development Plan.

Water Systems and Hydrants (\$775,000) and Road Improvements and Extensions (\$110,000) - CRC's 70-year-old water distribution system has deteriorated from corrosion and needs extensive upgrading to eliminate the currently inefficient double-direction water main, persistent leaks, and rusty water. All ancient fire hydrants will also be replaced and suitably relocated in order to improve fire protection. The Center's 20 year-old road system has deteriorated as a result of overuse and annual freeze-thaw cycles. Because many of the water mains needing replacement are located under the existing roads, the Zoo will simultaneously upgrade the water system and road system.

Maintenance Facility (\$1,200,000) - At present, CRC maintenance activities are located in ten separate buildings spread throughout the property, a situation that is inefficient in terms of time, supervision, and cost. A new maintenance facility will consolidate all operational shops and maintenance-grounds personnel into several adjacent, space-efficient buildings and will eliminate traffic through the central area of the Center. As outlined in the Center's Master Plan, vacated maintenance buildings will be either razed or renovated for use as research laboratories in future years.

Multi-Purpose Animal Facility (\$2,000,000) - In 1988, only 60 black-footed ferrets remained in a single captive colony in Wyoming. NZP staff provided advice on both reproduction and medical care. Subsequently, the Zoo qualified as one of only two zoos to receive these animals for propagation and eventual reintroduction. In late 1988, a CRC bird facility was quickly modified and an animal keeper position was

reprogrammed to accommodate the ferret program. Seven young were born during 1989, and research on reintroduction techniques is now underway at CRC. Although the involvement with ferrets will not last more than five years, NZP will shoulder similar programs for critically endangered species at an increasing frequency in the future. The FY 1991 request includes a multi-purpose animal facility designed specifically for the propagation of and research on small and medium-sized vertebrates. This no-frills, highly flexible solar-powered structure will provide both indoor and outdoor enclosures for a variety of species.

Wildlife Training Center Design (\$180,000) - CRC will continue to expand its widely acclaimed international training programs that have now involved representatives from more than 35 developing nations. The proposed educational training center will include a complex of classroom, laboratory, auditorium, living, and recreational spaces. This structure will consolidate training operations at one location, while at the same time serving both the training and small-conference needs of NZP and other branches of the Smithsonian. The Zoo requests \$180,000 for FY 1991 for design of this center. The estimated construction cost is \$1,800,000.

RENOVATION, REPAIR AND IMPROVEMENTS:

Rock Creek (\$2,000,000) - The National Zoological Park is responsible for the repair and preventive maintenance of existing facilities. The Zoo strives to maintain a safe environment for its visiting public and staff, to provide ecologically suitable and comfortable enclosures for the animals, and to maintain buildings in good condition. The funding requested for FY 1991 will help ensure that the Zoo's future preventive maintenance program will not include a large backlog of major repairs.

The Zoo's Rock Creek facilities, on 163 acres, include more than 450,000 square feet of buildings and 160,000 square feet of roofs. Along with the Park's perimeter fence measuring 10,564 lineal feet, the Zoo's in-ground utility distribution system includes over 4,600 lineal feet of high voltage electrical lines, approximately 4,000 lineal feet of medium voltage electrical lines, 16,000 lineal feet of water mains, 6,000 lineal feet of gas mains, 28,000 lineal feet of sewer lines, and 14,000 lineal feet of storm drains. The Zoo's preventive maintenance program includes the care of these utility systems to ensure safe operation of the facilities. An extensive system of pedestrian paths and vehicle roadways also requires regular maintenance.

The major projects planned for FY 1991 at the Rock Creek facility include:

- ongoing HVAC repairs;
- roof repairs to animal buildings and support facilities;
- repairs to antelope yards;
- repair and replacement of exhibit rockwork and glass;
- repair and replacement of animal exhibit doors;
- painting of animal exhibit spaces;
- renovation of laboratory and support spaces.

The National Zoological Park requests \$2,000,000 to continue its program of renovation, repair, and preventive maintenance at the Rock Creek facility. Funding at this level will enable the Zoo to provide the required level of maintenance to all buildings.

Conservation and Research Center (\$800,000) - The Conservation and Research Center at Front Royal is a nonpublic facility devoted to the conservation of endangered wildlife through programs in propagation, research, and international training. The 3,150-acre facility includes more than 89 structures ranging from animal shelters to research laboratories and residences. The property has 2 1/2 miles of roads, 20 miles of jeep trails, and more than 30 miles of fences.

Funding in FY 1991 will enable NZP to complete the required maintenance and upkeep these diverse facilities. Specific projects scheduled for FY 1991 at CRC include:

- roof repairs to several residences and animal barns;
- renovation and repair of hoofed stock sheds at Slate Hill, Rockhill, and Longfield pastures;
- renovations and repairs to Building 17;
- interior renovation of Building 112;
- exterior and interior renovation of Building 142;
- installation of nonslip flooring in Veterinary Hospital quarantine areas;
- grading and repair of selected roads.

The \$800,000 that NZP requests for FY 1991 will extend the Center's preventive maintenance program and help reduce future costly repairs at this important facility.

REPAIR AND RESTORATION OF BUILDINGS

1989 Appropriation.....	\$20,735,000
1990 Estimate.....	\$26,653,000
1991 Estimate.....	\$35,000,000

Smithsonian facilities include 14 museums and gallery buildings in Washington, D.C., and New York City and total more than 5.5 million square feet of building space. These museum buildings house research and collections management activities and a wide range of exhibitions in the fields of science, history, technology, and art. The Institution also operates and maintains restoration, storage, aircraft, and spacecraft display facilities in the Museum Support Center at Suitland, Maryland; centers for biological research, conservation, and education in Panama and on the Chesapeake Bay near Edgewater, Maryland; a center for astrophysics in Cambridge, Massachusetts; and the Whipple Observatory on Mt. Hopkins in Arizona. These facilities range in age from new to more than 140 years old, and many appear on the registers of historic landmarks.

The Repair and Restoration of Buildings (R&R) account pays the cost of repairs, corrective measures to meet life safety and health regulations, and replacement or renovation of major building components or equipment. This budget document discusses the repairs and renovations at the National Zoological Park as a separate justification.

The heavy public use of buildings and the demands on building equipment and systems for constant temperature and humidity levels to protect the National Collections exacerbate the natural aging process of building materials. Eventually, even effective preventive maintenance and regular repair programs cannot keep the equipment components of building systems operating. The Institution must overhaul heating, ventilation, and air conditioning (HVAC), and electrical and plumbing systems periodically to replace deteriorated equipment, wires, ducts, and pipes. It must repair the effects of weather on the exterior of buildings and guard against interior damage. In addition, the enactment of new codes and regulations calls for building modifications to ensure a safe and healthful environment for visitors and staff.

In past years, funding levels for maintenance, repair, and preservation of buildings have not kept pace with the rate of deterioration. A substantial backlog of essential repair work exists. These repairs are vital to ensure continued functionality of building equipment and systems, long-term preservation of the buildings, or compliance with life safety and health codes and standards. The current estimate of the backlog of projects is \$195 million. Only major funding increases will reduce this backlog and preserve buildings for continued use by future generations. Annual funding at the "current services" level in the Repair and Restoration of Buildings program is not sufficient to support the work required. Some of the work is, in fact, more urgent today because inadequate funding in the past prevented the timely repair or replacement of building systems and components.

The Smithsonian separates projects under the R&R program into two categories and accordingly requests funding in two subaccounts. The first subaccount, Major Capital Renewal, includes funds for the cyclical replacement of major building systems and equipment and major renovation projects required to assure long-term preservation of the buildings. These projects are different in magnitude, expense, and planning complexity from ongoing restoration work, preventive maintenance projects, or repairs undertaken when a piece of equipment fails. More than half the identified backlog consists of these major replacement requirements for HVAC and electrical systems at

the Natural History, American History, Smithsonian Institution, Arts and Industries, and American Art and Portrait Gallery buildings.

The second R&R subaccount is Repairs, Restoration, and Code Compliance. Funding requested through this subaccount will eliminate, over a period of time, the remainder of the backlog of repairs and other work needed to meet safety and health requirements. This subaccount encompasses six categories of routine maintenance and repair projects. This budget request presents an aggregate amount for each of the six categories above, with a description of the kinds of work planned.

The composition of the FY 1991 R&R budget request follows:

REPAIR AND RESTORATION OF BUILDINGS

MAJOR CAPITAL RENEWAL	\$13,930,000
REPAIRS, RESTORATION, AND CODE COMPLIANCE	
General Repairs	3,785,000
Facade, Roof, and Terrace Repairs	9,090,000
Access, Safety, and Security Projects	2,565,000
Fire Detection and Suppression Projects	925,000
Utility Systems Repairs	3,405,000
Advanced Planning and Inspection	<u>1,300,000</u>
Subtotal	\$21,070,000
TOTAL REQUEST	\$35,000,000

Following the narrative description of the program for FY 1991, a listing shows all planned projects by building and R&R category.

MAJOR CAPITAL RENEWAL:

Projects in this category involve replacing major building systems and components that have outlived their useful lives. Complete replacement ensures long-term operation and preservation of the building. Modifications to the building also improve energy efficiency, meet fire detection and suppression requirements, and correct hazardous conditions. By grouping these kinds of tasks together, the Institution saves money and avoids repeated disruption to activities in the building. The Smithsonian achieves operating efficiencies as well by designing new building systems and components to work together. For example, by installing multiple-paned windows and increasing insulation, the Smithsonian can install heating and cooling equipment with lower capacity. The equipment costs less to purchase and install, and long-term operating costs are lower. The impact of renovation work on programmatic activities is a key factor in planning a major project. The overhaul of a building causes serious disruption to activities in the building. The Institution must relocate staff and collections from the areas under construction to prevent damage and to allow staff to continue working during the construction period.

For FY 1991, the Smithsonian requests \$13,930,000 for the projects listed below:

American History Building (\$3,790,000) - A 1982 study of the HVAC system of the 25-year-old American History Building recommended replacement of the deteriorated heating, ventilation, air conditioning, and refrigeration equipment systems and

controls. Replacement of these systems will ensure the continued provision of required environmental conditions in an energy efficient manner. The study also recommended modifications to the building envelope to increase energy efficiency. The Institution recently completed the required window and roof replacement and facade repairs using previously provided funding.

The 1986 Master Coordination Plan established a detailed schedule for replacing the HVAC and related systems. This plan also incorporated anticipated fire protection and asbestos removal work so that workmen could isolate vertical portions of the building and accomplish all work required in each segment at the same time. This scheduling of complex but interrelated projects will result in less disruption to the Museum's activities and save money through a single contract for the entire project. The final phases of the project will incorporate all work required in the office areas of the fourth and fifth floors and in the basement of the building.

Work in each vertical quadrant includes replacing the mixing boxes, controls, and air-handling equipment; installing new sprinkler and smoke detection systems and other fire protection improvements originally outlined in the Fire Protection Master Plan; and removing asbestos present in mechanical rooms and other areas of the building. The Museum is coordinating this project with its exhibit renewal program. The project includes the cost of relocating artifacts and personnel displaced in the course of the work.

The first phase of this project began with funding received in FY 1987 (\$1.2 million) and FY 1988 (\$1.6 million) and includes all work required in the east quadrant of the building. Funding received in FY 1989 (\$2.1 million) will cover Phase II, the west central quadrant. The Institution will use the \$3,675,000 anticipated for FY 1990 for Phase III in the west quadrant and design costs for the next phase of work. Of the \$3,790,000 requested for FY 1991, funds will support Phase IVa construction in the east central quadrant (\$3,300,000); design of the final phase of work which will include construction on the fourth and fifth floors (\$290,000); and relocation of staff and collections displaced by the work in progress (\$200,000).

Natural History Building (\$10,140,000) - Over the past several years the Institution undertook a number of separate studies of the Natural History Building to address energy conservation, fire detection and suppression, communications, security upgrading, asbestos abatement, and other remedies to building deficiencies, especially in the HVAC and electrical systems. As a result of these studies, the Institution realized the magnitude of the work required and initiated a Master Implementation Plan to ensure that the Natural History Building is maintained in an effective manner. The Institution will schedule work in a way to minimize disruption within the building and to reduce costs by grouping tasks. The Museum will coordinate the exhibit reinstallation program with the renovation project. The Institution proposes to fill in the East Court space with a new building to provide permanent expansion space for the Museum's current activities. The Museum will use this new building during the renovation project as staging space, to allow relocation of staff and collections affected by the renovation work to safe space while work is in progress. Construction of this building will require relocation of the current chiller plant to a new vault under the parking lot as well as accommodation for other functions now in the East Court space. A justification for the East Court Building is included in the Construction section of the budget request.

Guided by a Fire Protection Master Plan developed in 1979, fire protection improvements and asbestos removal and containment work are well under way. However,

the replacement of the HVAC and critical electrical equipment is the more significant aspect of this project, and thus governs the overall work schedule. The majority of the HVAC equipment is now more than 25 years old and requires replacement to avoid system failure. The automatic temperature control system is obsolete and does not operate satisfactorily. The age of 90 percent of the electrical lighting and power panels in the building is in excess of 20 years. Some of the electrical panels date from 1910 and present a potential safety hazard. Other panels installed in the 1960s are not UL (Underwriters' Laboratory) approved as meeting established safety standards, and replacement circuit breakers are no longer available. The main high-voltage switchgear equipment, which serves all the transformers for the Natural History, Freer Gallery, Arts and Industries, and Smithsonian Institution buildings, is approximately 40 years old. The Smithsonian must completely replace these components and other related electrical equipment because repair parts are no longer available.

The Institution will complete a detailed plan for the replacement of building systems at the Natural History Building in the fall of 1989. The plan will spread the work over a number of years to provide the most cost effective construction sequence, minimize disruption of programs, and obviate Museum closings. The scope of work includes:

- replacing the HVAC system with a new centralized system located in new penthouses over the east and west wings;
- replacing the chiller plant with updated equipment in a new vault beneath the southeast corner of the parking lot;
- modifying the building envelope, specifically by installing roof insulation, replacing single-glazed windows with triple-glazed windows, replacing roof rain leaders, and installing air locks or vestibules at entrances and loading docks;
- centralizing laboratories with new exhaust air systems;
- improving the automatic temperature control system;
- connecting the equipment to a central control and monitoring system.

The project will incorporate fire protection work originally conceived under the Master Plan. Work will also include removing or encapsulating asbestos insulation located in the attics and attached to equipment, ductwork, and piping throughout the building.

Funds appropriated in FY 1986 (\$235,000) supported the Master Implementation Plan and the evaluation of the potential requirements for interim measures to keep the facility operational through the construction period. Amounts of \$100,000 and \$475,000 received in FY 1987 and FY 1988, respectively, will complete planning for the renovation project and begin assessing requirements for the relocation of staff and collections affected by the construction. The plan will include a detailed schedule and cost estimate on which to base future budget requests. The Institution will use the \$1,000,000 appropriated in FY 1989 and the \$9,950,000 anticipated in FY 1990 for design and construction of the new underground chiller plant; predesign work for the entire renovation project; and detailed design of the penthouses over the east and west wings, and the roof, attic, and window work.

For FY 1991, the Institution requests \$10,140,000 for the construction of the penthouses and for emergency replacement of electrical and HVAC equipment not expected to remain operative throughout the construction period (\$9,150,000); preparation of design and specification documents for the next phase of construction (\$540,000); and relocation of staff and collections (\$450,000).

REPAIRS, RESTORATION, AND CODE COMPLIANCE:

Projects in this category include:

- minor, unscheduled, but essential repairs to sidewalks, roads, parking lots, waterproofing, electrical and lighting systems, plaster walls, and marble floors;
- repairs to facades, roofs, terraces, and window frames;
- improvements to assure access for the disabled; asbestos abatement, renovations to elevators, correction of exhaust problems, construction of chemical and hazardous material storage facilities, installation of emergency electrical generator system; and installation of security devices and lighting;
- installation of heat and smoke detection systems, sprinkler and chemical suppression systems, fire doors and fire rated walls, and lightning protection and exit capability improvements;
- repairs and energy conservation improvements to HVAC plumbing, electrical, and communications systems;
- inspection and advanced design of future-year projects and long-range planning for repair and restoration of Smithsonian facilities.

For FY 1991, the Smithsonian requests \$21,070,000 for the projects listed below:

General Repairs (\$3,785,000) - Funds requested in this category support a wide variety of projects. These funds provide resources for minor, unscheduled, but essential repairs that the Institution cannot anticipate specifically or do not fit into one discrete category. For FY 1991, the Institution requests \$3,785,000 for such projects as:

- replastering and painting of damaged areas in the Rotunda and exhibit halls in the Arts and Industries Building;
- repairs to the electric snow melting system beneath the east and west ramps to the parking garage at the Air and Space Building;
- replacement of the failing suspended ceiling system on the third floor of the Air and Space Building;
- structural repairs to the Tivoli Administration Building at the Smithsonian Tropical Research Institute;
- repairs to sidewalks, parking lots, and roads at various locations;

- general repairs at off-Mall facilities;
- emergency repairs required throughout the Smithsonian.

In addition, the funds will allow the completion of several projects begun in previous years. These projects include:

- repair and modification of the public rest room facilities at the Air and Space Building;
- repair and restoration of the lower level of the Old Dominion Building and repairs to the water tower at the Smithsonian Environmental Research Center;
- renovation and repair of the gallery level of the Freer Gallery Building to correct electrical and lighting problems and to repair or replace badly deteriorated plaster walls and cracked marble floors;
- repair of waterproofing and leak detection at the American Art and Portrait Gallery Building.

Facade, Roof, and Terrace Repairs (\$9,090,000) - Maintaining the integrity of the exteriors of all Smithsonian buildings is critical. This maintenance will prevent major structural and interior damage and deterioration due to age, water intrusion, and weathering. Proper care will ensure a safe environment for visitors, staff, and collections. In addition, energy conservation demands weather-tight exteriors. Work in this category includes a variety of projects accomplished cyclically and varies with the life of the materials used. For example, roofs need replacing nearly every 20 years; facade joints need recaulking and repointing about every ten years; and window frames and other exterior trim need repainting every five years. Several Smithsonian buildings now require large-scale restoration. The Institution plans to offer additional protection for building exteriors through an enhanced preventive maintenance and repair program.

For FY 1991, the Institution requests \$9,090,000 for facade, roof, and terrace repairs. Planned projects include roof inspection, repair, or replacement at the American Art and Portrait Gallery Building, the Air and Space Building, the Cooper-Hewitt Museum, and the Smithsonian Tropical Research Institute. Funding will support projects at the Air and Space Building to correct original building deficiencies and water intrusion problems by replacing the skylights and windows. Work will continue at the Smithsonian Institution Building to restore the windows and the facade stones and to repoint the building's facade masonry. The Institution will complete the resurfacing of the deteriorated plaza at the Hirshhorn Building and correct a water intrusion problem caused by penetration through the inner court window wall sills. Other projects funded from this sub-account include:

- repairing, restoring, and painting the historic iron fence at the Cooper-Hewitt Museum;
- repairing the waterproofing membrane beneath the terrace at the American History Building;
- repairing and painting wooden and metal facades and building elements at a variety of locations.

Access, Safety, and Security Projects (\$2,565,000) - The Institution continues to emphasize providing better access for disabled persons, improving environmental conditions for the health and safety of visitors and staff, and correcting facility conditions that threaten the security of the National Collections.

For FY 1991, the Institution requests \$2,565,000 for a number of important projects in these areas. Projects to improve access for disabled persons in order to meet current code requirements include:

- modifying the entrances to the Arts and Industries Building to ensure full access by the disabled, elderly, and visually impaired;
- modifying and modernizing restrooms in the Smithsonian Institution Building for handicapped access and more flexible use by female employees and visitors.

Among the projects planned for correction of hazardous conditions are:

- continuing the asbestos abatement program;
- renovating elevators at the Natural History Building to ensure safe operation;
- constructing storage facilities for chemicals, fuel, and other hazardous materials at several locations at the Smithsonian Tropical Research Institute.

Other safety-related projects that will continue include correcting the fume hood exhaust deficiencies at the Museum Support Center and installing emergency electrical generator systems at several facilities.

Projects for FY 1991 to improve security of the collections, staff, and visitors include:

- completing installation of internal barriers and monitoring equipment in the Numismatics vault at the American History Building;
- installing elevator monitor panels at the Air and Space Building;
- completing the security system at the Freer Gallery Building;
- improving illumination around buildings and in parking lots on the Mall and at the Anacostia Building for more effective surveillance.

Fire Detection and Suppression Projects (\$925,000) - A major Institutional priority is to provide the best fire protection and safety measures available under today's standards and with state-of-the-art technology. The Natural History, American History, Air and Space, American Art and Portrait Gallery, and Smithsonian Institution buildings have fire protection master plans. For FY 1991, the request of \$925,000 will continue fire protection master plan work in these buildings and make other fire protection improvements at the Cooper-Hewitt Museum and the Hirshhorn Building. Work will include the installation of heat and smoke detection systems, sprinkler and chemical suppression systems, and fire doors and walls and the improvement of exit capability.

Utility Systems Repairs (\$3,405,000) - Funds in this category will maintain, repair, and upgrade the heating, ventilating, and air conditioning systems, and plumbing, electrical, and communications systems throughout the Institution's facilities. Ongoing renovations, repairs, and replacements of deteriorated equipment components are essential for ensuring continued energy efficient operation of utility systems. The long-term preservation of the National Collections is dependent upon stable temperature and humidity conditions.

Energy conservation remains a high priority at the Smithsonian. The most significant energy savings will result from upgrading HVAC systems, replacing obsolete equipment, and improving the efficiency of environmental zones. The Institution modifies existing HVAC systems to accommodate programmatic growth, changes in the use of buildings, and the environmental needs of collections as they become better understood. The Institution uses an integrated approach to renovations and modifications to plan for long-range, systematic HVAC improvements that will meet museum environmental requirements in an energy efficient manner.

Comprehensive HVAC studies and energy audits for most of the buildings facilitate planning of other improvements. The scope of HVAC studies includes field investigations of age, condition, and performance of existing equipment, controls, and current operating conditions; reviews of existing drawings, specifications, operating manuals, and hygrothermograph records; analyses of the relationship between the building structures and HVAC systems; and assessments of programmatic needs for environmental control. The data gathered by these studies provide a basis for determining redesign or replacement needs of existing HVAC systems; developing construction cost estimates; and establishing priorities for the repair, replacement, or modification of such equipment components as air-handling units, chillers, condensers, compressors, cooling towers, automatic temperature and humidity controls, pumps, pipes, fans, filters, ductwork, and related electrical and plumbing systems. At the same time, energy audits investigate all factors relating to energy use, such as power-consuming equipment and building conditions (doors, windows, insulation, floors, and partitions). After identification of energy conservation opportunities and evaluation of costs and potential energy savings, plans will guide the renovation and improvement work. This process identified a number of major system replacements that the Major Capital Renewal subaccount will fund in addition to minor repairs and renovations requested in the Utility Systems Repairs category.

Funding of \$3,405,000 requested in FY 1991 in this category will support routine repair, replacement, and modification projects. These projects include:

- continuing miscellaneous HVAC repairs at the Hirshhorn Building and the Anacostia Building;
- repairing HVAC, electrical, and plumbing systems at the Smithsonian Tropical Research Institute;
- renovating cooling towers at the American Art and Portrait Gallery Building and the Museum Support Center;
- renovating or repairing electrical systems at the McAlpin-Miller House of the Cooper-Hewitt Museum and various buildings at the Silver Hill Facility and the Smithsonian Tropical Research Institute;

- modifying the electrical distribution system of the Air and Space Building to ensure continuity of power;
- replacing the deteriorated drinking water chiller at the American History Building;
- replacing the microwave communications tower to improve telephone service to Barro Colorado Island at the Smithsonian Tropical Research Institute;
- enclosing the uninterruptable power source for the Multiple Mirror Telescope at the Fred Lawrence Whipple Observatory.

Several planned utility improvement projects include continuing code compliance and energy conservation measures at the Cooper-Hewitt Museum, modifying the interior lighting system in the Hirshhorn Building to operate in more closely controlled zones, installing state-of-the-art automated controls on HVAC equipment, and auditing energy efficiency at the Smithsonian Institution Building. In addition, the project to install cabling in the Mall master raceway system will continue.

Advanced Planning and Inspection (\$1,300,000) - Systematic and comprehensive planning is a vital component of an effective facilities management program. Funds in this category support projects to inspect and plan long-range repair and restoration needs and to develop advanced design of future-year projects. The amount of \$1,300,000 requested in FY 1991 will continue development of an integrated master plan for all facilities and update the master plan for the Smithsonian Environmental Research Center. The funds will initiate an accessibility master plan for the Institution and plan restoration requirements in the Natural History Building and the Cooper-Hewitt Museum. In addition, the Smithsonian will continue to use these funds to design smaller, single-year projects before receipt of appropriations as a basis for more accurate cost estimates. The Institution can realize significant cost savings in escalation costs by completing the design of projects in advance of receipt of funding.

REPAIR AND RESTORATION OF BUILDINGS

Detail of FY 1991 Request by Building

<u>FACILITY, ACCOUNT, AND PROJECT TITLE</u>	<u>SUBCATEGORY</u>	<u>ESTIMATED COST</u>
<u>Air and Space Building</u>		
REPAIR, RESTORATION, AND CODE COMPLIANCE		
Third Floor Ceiling Replacement	General	650,000
Public Restroom Modifications	General	265,000
Snow Melter Repair at Ramps	General	300,000
Roof Replacement	Facade	200,000
Skylight Replacement	Facade	3,400,000
Window Replacement	Facade	1,000,000
Elevator Monitor Panel Installation	Access	30,000
Fire Protection Master Plan Implementation	Fire	300,000
Electrical Reliability Improvements	Utility	<u>1,100,000</u>
TOTAL FOR FACILITY		\$7,245,000
<u>American History Building</u>		
MAJOR CAPITAL RENEWAL		
Master Coordination Plan, Phase IVb		3,300,000
Design, Phase IV		290,000
Relocation		<u>200,000</u>
SUBTOTAL		\$3,790,000
REPAIR, RESTORATION, AND CODE COMPLIANCE		
Terrace Repairs	Facade	650,000
Numismatics Security Study Implementation	Access	35,000
Panic Hardware Installation	Fire	25,000
Drinking Fountain System Replacement	Utility	<u>50,000</u>
SUBTOTAL		\$760,000
TOTAL FOR FACILITY		\$4,550,000
<u>American Art and Portrait Gallery Building</u>		
REPAIR, RESTORATION, AND CODE COMPLIANCE		
Waterproofing and Detection	General	50,000
Roof Moisture Repair	Facade	50,000
Fire Protection Improvements	Fire	125,000
Cooling Tower Modifications	Utility	<u>50,000</u>
TOTAL FOR FACILITY		\$275,000
<u>Anacostia Building</u>		
REPAIR, RESTORATION, AND CODE COMPLIANCE		
General Repairs	General	30,000
Building and Parking Lot Illumination	Access	50,000
HVAC System Repairs	Utility	<u>150,000</u>
TOTAL FOR FACILITY		\$230,000

Arts and Industries Building

REPAIR, RESTORATION, AND CODE COMPLIANCE

Rotunda and Halls Painting	General	165,000
Disabled Accessibility Modifications	Access	<u>200,000</u>

TOTAL FOR FACILITY		\$365,000
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Cooper-Hewitt Museum

REPAIR, RESTORATION, AND CODE COMPLIANCE

General Repairs	General	50,000
Roof Replacement	Facade	2,700,000
Fence Repair and Painting	Facade	80,000
Fire Protection Improvements	Fire	200,000
Electrical Renovation, McAlpin-Miller House	Utility	250,000
Energy Study Implementation	Utility	400,000
Restoration Planning Study	AdvPlan	<u>50,000</u>

TOTAL FOR FACILITY		\$3,730,000
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Freer Gallery Building

REPAIR, RESTORATION, AND CODE COMPLIANCE

Gallery Level Renovation	General	800,000
Security System Completion	Access	<u>350,000</u>

TOTAL FOR FACILITY		\$1,150,000
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Hirshhorn Building

REPAIR, RESTORATION AND CODE COMPLIANCE

Plaza Resurfacing	Facade	300,000
Court Sills Repairs	Facade	30,000
Fire Protection Improvements	Fire	70,000
HVAC Systems Repairs	Utility	260,000
Interior Lighting Zoning Modifications	Utility	<u>200,000</u>

TOTAL FOR FACILITY		\$860,000
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Museum Support Center

REPAIR, RESTORATION, AND CODE COMPLIANCE

Fume Hood Modifications	Access	100,000
Cooling Tower Renovation	Utility	<u>90,000</u>

TOTAL FOR FACILITY		\$190,000
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Natural History Building

MAJOR CAPITAL RENEWAL

Master Plan Improvements		9,150,000
Design		540,000
Relocation		<u>450,000</u>
SUBTOTAL		\$10,140,000

REPAIR, RESTORATION, AND CODE COMPLIANCE		
Elevator Repairs	Access	90,000
Public Area Restoration Planning	AdvPlan	<u>50,000</u>
SUBTOTAL		\$140,000

TOTAL FOR FACILITY		\$10,280,000
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Silver Hill Facility

REPAIR, RESTORATION, AND CODE COMPLIANCE		
General Repairs, All Buildings	General	100,000
Electrical Repairs	Utility	<u>225,000</u>

TOTAL FOR FACILITY		\$325,000
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Smithsonian Tropical Research Institute

REPAIR, RESTORATION, AND CODE COMPLIANCE		
General Repairs	General	100,000
Structural Repairs, Admin. Bldg. - Tivoli	General	45,000
Roof Repairs, Various Sites	Facade	55,000
Chemical/Hazardous Material Storage-Gamboa	Access	50,000
Chemical/Hazardous Material Storage-Naos	Access	50,000
HVAC, Electrical, & Plumbing Repair-Ancon	Utility	100,000
HVAC Repairs/Replacement, Building 352-Naos	Utility	30,000
Electrical Rewiring - BCI	Utility	35,000
Communications Structure Replacement-BCI	Utility	<u>45,000</u>

TOTAL FOR FACILITY		\$510,000
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Smithsonian Institution Building

REPAIR, RESTORATION, AND CODE COMPLIANCE		
Window Restoration/Replacement	Facade	200,000
Facade Restoration (Masonry)	Facade	50,000
Facade Repointing	Facade	175,000
Restroom Modifications	Access	160,000
Energy Audit	Utility	<u>75,000</u>

TOTAL FOR FACILITY		\$660,000
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Smithsonian Environmental Research Center

REPAIR, RESTORATION, AND CODE COMPLIANCE		
General Repairs	General	60,000
Old Dominion Building Lower Level Repair	General	390,000
Water Tower Repairs	General	30,000
Master Plan Update	AdvPlan	<u>150,000</u>

TOTAL FOR FACILITY		\$630,000
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Smithsonian Astrophysical Observatory

REPAIR, RESTORATION, AND CODE COMPLIANCE

Road Repairs and Improvements	General	325,000
General Repairs - Whipple	General	50,000
General Repairs - Oak Ridge	General	60,000
General Repairs - Cambridge	General	15,000
MMT Uninterruptable Power Source		
Enclosure-Whipple	Utility	<u>20,000</u>

TOTAL FOR FACILITY \$470,000

Miscellaneous Locations

REPAIR, RESTORATION, AND CODE COMPLIANCE

Grounds, Sidewalk, and Parking Lot Repairs	General	100,000
Emergency Repairs	General	200,000
General Facade Renovations	Facade	200,000
Asbestos Abatement	Access	1,000,000
Emergency Power Study Implementation	Access	100,000
Security Lighting - Mall Buildings	Access	350,000
Lightning Protection at Various Sites, Phase 2	Fire	205,000
HVAC Controls Upgrade	Utility	200,000
Mall Master Raceway System	Utility	125,000
Advanced Planning and Design	AdvPlan	500,000
Combined Master Plan for All Facilities	AdvPlan	250,000
Institution-wide Accessibility Master Plan	AdvPlan	<u>300,000</u>

TOTAL MISCELLANEOUS \$3,530,000

TOTAL REQUEST, REPAIR AND RESTORATION OF BUILDINGS \$35,000,000

CONSTRUCTION

1989 Appropriation.....	\$ 8,655,000
1990 Estimate.....	\$10,000,000
1991 Estimate.....	\$61,490,000

The FY 1991 request for funding in the Construction account represents a major investment in the Institution's long-range program goals. The Institution has a growing backlog of infrastructure requirements for physical plant expansion and modification to support program requirements. The Smithsonian staff has assembled these needs into a comprehensive long-range capital improvement program for the next decade. The FY 1991 Construction request will address the most urgent components of this program. Funding of these projects is essential to maintain vitality in the Institution's far-reaching programs of research, collections management, public exhibitions and education, and other services.

This year's Construction request is as follows:

MAJOR CONSTRUCTION	
Air and Space Museum Extension	\$ 6,000,000
Collections Management Center	500,000
General Post Office Building	38,250,000
National Museum of the American Indian	8,200,000
Natural History East Court Building	1,500,000
Subtotal	\$51,450,000
CONSTRUCTION PLANNING	1,500,000
MINOR CONSTRUCTION, ALTERATIONS, AND MODIFICATIONS	<u>5,540,000</u>
TOTAL	\$61,490,000

Air and Space Museum Extension (\$6,000,000) - The National Museum Amendments Act of 1965 directs the National Air and Space Museum to "collect, preserve, and display aeronautical and space flight equipment of historical interest and significance." In keeping with the Smithsonian's general mandate to increase and diffuse knowledge, the Museum also conducts collections-related research and interprets the significance of the mass of new scientific discoveries and successive waves of technological advance that are associated with aviation and space flight.

The National Air and Space Museum (NASM) currently faces a critical shortage of facilities that threatens to cripple its basic collecting program. In the 42 years of its existence, the Museum has brought together the most significant collection of aircraft and spacecraft in the world. The Museum exhibits and stores its collection of aircraft and spacecraft and related artifacts in the Mall building and at the Paul E. Garber Facility in Suitland, Maryland. These buildings are filled to capacity, despite deliberate steps to limit the growth of the collection. A number of significant items can now only be accommodated outside, where they are subjected constantly to the highly destructive effects of acid rain and other environmental elements. The enormous size of contemporary aircraft and spacecraft also prohibits the Museum from adding important artifacts to its collections. A number of aircraft that belong in the collections cannot be stored at either site because it is physically impossible to transport them from the airfield to which they are delivered, even if dismantled. The Museum's extensive program of lending aircraft and spacecraft to other museums in the United States and abroad has helped to relieve this problem, but the Institution risks interrupting the continuity of its collections if appropriate space for storage of significant larger artifacts is not found.

The advanced age and deteriorated condition of the Suitland buildings also jeopardizes long-term preservation of the Museum's existing collection. The Garber Facility includes approximately 23 temporary metal structures, many of which date from the late 1940s and early 1950s. A recent building survey completed as part of the Suitland Master Plan estimated the future lifespan of most of these buildings as between ten and 15 years. Furthermore, most of the buildings do not provide the controlled climatic conditions necessary for preservation of fragile museum materials.

In addition to storage problems, artifact size has dictated exhibit limitations as well. The Museum cannot display a number of significant aircraft and spacecraft now in its collections because they are too big and/or too heavy for the Mall building. These include the Boeing 367-80 (prototype for the 707), Vought XF8U Crusader, Saturn V launch vehicle, Boeing Flying Fortress, Sikorsky S-43 Flying Boat, B-29 Enola Gay, and the space orbiter Enterprise. Furthermore, NASM, as interpreter of the significance of advances in aerospace technology, is keenly aware that current exhibitions are largely unable to focus on the tremendous social impact of aviation and space flight or the policy implications that human advances in space hold for the future, largely because of space constraints. The Museum cannot extend the history of space flight and aviation now exhibited or discuss its social and policy implications unless the larger contemporary aircraft and spacecraft that are essential for communication of these ideas are available at the Smithsonian in appropriately located facilities.

An Air and Space Museum Extension at or near an airport in the Washington area would best meet the physical requirements for storage and exhibition of contemporary aircraft and spacecraft. Such an extension, located and constructed to accommodate large-scale artifacts, would provide the context for communicating the complex themes of social, environmental, and policy change that have been ushered in by their use.

The Smithsonian is considering locations at the Baltimore-Washington International and the Dulles International airports for the proposed Extension to NASM. The Institution hired an architectural firm in FY 1989 to compare logistical and physical characteristics of these two sites. This study will assist the Institution in determining the most appropriate location for the Extension. The criteria include:

- proximity to an active runway;
- flexibility in building configuration and space for future expansion;
- adequacy of existing and projected transportation networks for visitor access and artifact movement;
- compatibility with and noninterference from existing airport operations and absence of vibration, noise, and fumes (from aircraft and vehicular traffic);
- potential numbers of visitors that might be attracted;
- geological configuration and subsurface conditions;
- availability of utilities and vital support services, such as police and fire departments.

The study also evaluates potential local, regional, and state support, as well as wider-ranging Smithsonian use of the site.

The Smithsonian expects to complete the proposed Extension in several phases, starting with a component that will meet the Museum's most pressing collections storage and exhibition needs. The contractor has provided preliminary cost estimates and schedules for construction and operation at both sites. Of the \$162 million total estimated cost for Phase I, approximately two-thirds (\$107 million) will come from Federal appropriations and the balance (\$55 million) will come from fund raising and state support. Once the site is selected, the Institution will use FY 1990 construction planning funds for further planning of the Extension. In FY 1991, the Institution requests \$6,000,000 to design this initial phase of the Extension project.

Collections Management Center (\$500,000) - A vital component of the Smithsonian's mission is collecting and preserving significant artifacts that document human history and reflect human achievements in the arts and sciences. The Institution has for a number of years experienced a severe shortage of space in which to store, document, and conserve its collections. The Museum Support Center, which opened in 1983, and a proposed Extension to the National Air and Space Museum at a local airport will provide space to solve the most immediate storage needs for natural history and aerospace collections. However, space is urgently needed to ensure the continued preservation of the collections and the vitality of the collections management and reference programs of other Smithsonian museums and bureaus. The Institution has made concerted efforts to limit the growth of collections by carefully screening offers of donation, deaccessioning marginal items collected in the past, and extensive loan programs. Despite these efforts, the Smithsonian's collections have of necessity continued to expand.

The Institution has begun documenting its immediate and long-term needs for additional space to house growing collections in history and art, as well as important archival and library collections. Based on the initial phase of the Suitland Master Plan, the Institution will require more than 1 million square feet of new storage and collections management space over the next two decades.

The space problem is exacerbated by the age and condition of the present storage buildings at the Smithsonian's facility in Suitland, Maryland. Among the structures at Suitland are temporary metal buildings that provide approximately 115,000 square feet of storage space for the National Museum of American History (NMAH). Most of these buildings have a remaining life expectancy of less than ten to 15 more years. Since half of NMAH's collections, exclusive of stamps and coins, reside there, it is essential to have facilities ready in the next decade to ensure that the National Collections have proper housing. Other Smithsonian museums, as well as archival and library bureaus, are also experiencing serious shortages of appropriate collections storage space. Space in Mall museums is already severely overcrowded, and several museums and bureaus have moved collections into leased space in off-Mall locations to avoid damage and deterioration of artifacts from excessive compression. However, many of these locations, including most of the Suitland buildings, do not provide environmental conditions necessary for long-term preservation of collections.

The proposed construction of an Air and Space Museum Extension at a local airport and subsequent move of Air and Space collections now stored at Suitland to the new facility provide an opportunity to develop the Suitland site to meet most of the

Institution's remaining collections storage and management needs. The Smithsonian plans to sequence demolition of the existing buildings and construction of new collections management facilities at Suitland over the next ten to 20 years. The Institution contracted in FY 1989 for the initial portion of the second phase of the Suitland Master Plan. The contractor will complete the plan in FY 1990, using construction planning funds. The Master Plan will assess the space requirements identified in Phase I and determine how these requirements can be translated into effective building configurations on the Suitland site. The study will detail such issues as land use, circulation, site development, and utilities. The Master Plan will also establish initial cost estimates and construction schedules. For FY 1991, the Institution requests \$500,000 to carry the planning process into the next stage. This planning will develop more specific program and facility requirements, refine estimates and schedules for construction, identify and analyze logistical issues, and establish operating cost estimates. This detailed level of planning is essential and must precede a request for authorization and funding of construction.

General Post Office Building (\$38,250,000) - The General Post Office Building is bounded by 7th, 8th, E, and F Streets in Northwest Washington, D.C. Its original wing (on the E Street side of the building) is the work of America's first native-born professional architect, Robert Mills, of South Carolina. Mills also designed the Patent Office Building, the original plan for the Washington Monument, and the Treasury Building. The General Post Office Building is the fifth oldest public building in Washington and has never been renovated or restored.

On October 19, 1984, the President signed Public Law 98-523 authorizing transfer of the General Post Office Building from the General Services Administration to the Smithsonian Institution without reimbursement. The legislation also authorized appropriations of up to \$40 million to the Institution for the renovation of the building. The General Services Administration is currently using the building for temporary housing of a number of Federal agencies. Custodianship of the building will transfer to the Smithsonian when renovations funding is available. No Smithsonian program activities will occupy the building until building modifications are complete.

The Institution is concerned about the long-term preservation of this historic landmark and plans a comprehensive program of restoration and repairs to make the building usable for Smithsonian activities. The Institution will complete the plans for the building's use by the end of 1989 and will use \$1,750,000 anticipated for FY 1990 to begin the design of the restoration.

The building is in very poor condition. Asbestos insulation encases exposed plumbing in almost every space. Because the drinking water is unsafe, occupants must use bottled water. Other conditions include:

- an oversubscribed electrical system that is in poor condition and is a potential fire hazard;
- an unreliable steam heating system with corroded and heat-leaking exchanger tanks;
- deteriorated pumps and other mechanical equipment;
- window air conditioners, in various states of repair;

- very old, unreliable central air conditioning units that serve limited areas.

The building has no fire safety systems, such as water sprinklers and smoke detectors, and the existing fire alarm system consists of old, unreliable pull stations. One of the building's two small passenger elevators is automatic and reportedly has several deficiencies, and the other requires an operator. Both are very old and reportedly subject to frequent breakdowns. Recent roof repairs did not replace the rain gutters and interior downspouts, and these are subject to intermittent failure, causing leaks in the building. Window frames have dry rot, and the poor condition of the exterior stone facade exacerbates interior water problems. The interior courtyard, a paved parking area over a wooden structure, may be structurally unsound. The building is not safe for continued occupancy in its present deteriorated condition.

The Institution proposes a comprehensive program to preserve the historic nature of the building and restore it for Smithsonian use and make it safe to occupy. The planned work includes:

- repairing the stone facade;
- replacing rain gutters and interior downspouts and repairing interior water intrusion damage;
- restoring all original interior and exterior architectural finishes;
- repairing all windows;
- repairing all electrical and plumbing systems;
- providing new insulation, a vapor barrier where necessary, and a heating and air conditioning system with industrial quality controls;
- installing smoke detection and sprinkler systems along with security equipment;
- repairing and replacing elevators.

The proposed renovations will preserve the building for future generations and will provide an energy-efficient, safe, and secure environment for collections, staff, and visitors. Although Congress authorized \$40 million for building renovation in 1984, the Institution currently estimates that the total cost of the project will exceed this amount. The initial design phase, funded with \$1,750,000 anticipated in FY 1990, will provide a detailed cost estimate for full renovation of the building. For FY 1991, the Smithsonian requests \$38,250,000 to complete design and most of the required renovations within the present authorization.

Postponement of this project will increase the risk of irreparable damage or deterioration of the building. Moreover, each year additional deterioration increases the cost of renovation and repairs. Inflation contributes to higher costs as well. Failure to make the most urgent improvements will prevent the Smithsonian from using the building even in the most basic way. Under current plans for funding the design phase in FY 1990 and initiating construction in FY 1991, it will be 1993 before the renovation is complete. Continued delay will adversely affect the public programs of

the Institution and result in a need for increased resources to lease alternative space to solve the most urgent programmatic problems.

National Museum of the American Indian (\$8,200,000) - On May 8, 1989, the Smithsonian and the Museum of the American Indian, Heye Foundation, signed an agreement that will transfer the Foundation's collection of Indian artifacts to the care and custody of the Smithsonian. This extraordinary collection includes one million Indian artifacts from all parts of the Western hemisphere. The Heye Foundation collection will form the basis of a new National Museum of the American Indian. The agreement also provides for transfer of the Foundation's endowment and most of its property, including a 40,000-volume library and an 86,000-item archives.

The creation of this new national museum is the culmination of almost a decade of negotiations between the Foundation, the City and the State of New York, and, more recently, the Smithsonian Institution. When the new museum is completed in the late 1990s, it will stand as a tribute to the many and varied contributions of American Indians, Eskimos, Aleuts, and other native-American cultures. In congressional testimony describing the potential of the museum, Secretary Robert McC. Adams has said, "It is likely to alter beyond all expectation public understanding of American Indian people."

Congress is considering legislation to provide facilities for the Museum to be housed in three locations:

- a major museum building to be constructed on the Mall in Washington, D.C., on land reserved for Smithsonian use by Congress in 1975;
- a satellite exhibition and education center to be located in a portion of the Old United States Custom House at the tip of lower Manhattan in New York City;
- a collections storage and research facility on Smithsonian land in Suitland, Maryland.

The Institution anticipates four major sources of funding for construction of these facilities: New York City; the State of New York; Federal appropriations; and private donations. The Institution anticipates an appropriation in FY 1990 for programming and planning all three facilities and the design of the Custom House conversion. For FY 1991, the Smithsonian requests \$8,200,000 for preparation of the Custom House space, design of the Suitland building, and completion of planning for the Mall museum. The details of this request follow:

The Museum on the Mall: The Institution will construct a new building on the National Mall at the foot of Capitol Hill, adjacent to the most frequently visited museums in the world. Congress reserved the last remaining construction site on the Mall for the Smithsonian in 1975. The location will provide excellent exposure for this significant collection of native-American artifacts. The Institution expects that this facility will house permanent and changing exhibitions, reference and collection areas, an auditorium and theater, museum shops, public education facilities, and space for research and other museum programs. The Institution projects the total cost of construction of the Mall building to be in the range of \$106 million and expects that approximately \$35 million will be provided from a national fundraising campaign.

This estimate assumes a construction start in 1994 and includes the cost of equipping the building. Initial planning efforts will define the program requirements and refine the construction and equipment estimate, as well as relevant logistical and operating requirements and costs. With \$800,000 anticipated in FY 1990, the Institution will begin programming and planning for the Mall museum building. For FY 1991, the Institution requests \$700,000 to complete preliminary planning, including concepts. The current schedule calls for completion of the building in FY 1997 and public opening in 1998.

The Old United States Custom House, New York City: The Institution will convert space in the Old United States Custom House in lower Manhattan, New York City, to house an extension of the National Museum of the American Indian. The New York facility, to be renamed in memory of George Gustav Heye, will contain space for exhibitions, education, and other public service programs. The Institution projects the cost of preparing the U.S. Custom House for museum use to be approximately \$25 million. The State of New York and New York City have each pledged to contribute one-third of the cost, or up to \$8 million apiece, toward construction of the George Gustav Heye Center. The Institution anticipates \$1.8 million in FY 1990 for planning and design of the Custom House facility. For FY 1991, the Smithsonian requests \$5,500,000 for construction. This funding sequence assumes the application of the 2:1 match of funds provided by New York City and the State to those obtained by the Institution. The current schedule calls for opening the facility to the public in FY 1994.

The Suitland Building: The Institution plans to construct a facility at its Suitland, Maryland, property adjacent to the Museum Support Center, to provide proper housing for the Heye Foundation collection. This building will collocate this extensive collection of Indian artifacts with Indian artifacts from the National Museum of Natural History, providing a central location for conservation, preservation, and collections-related research activities. The Institution currently expects the storage facility to cost approximately \$44 million to design, build, and equip, based on a construction start in 1992. The Smithsonian will use \$300,000 anticipated in FY 1990 for preliminary planning purposes. This planning will identify a specific site and building configuration, provide details such as geotechnical data, and help refine construction cost estimates and schedules. For FY 1991, the Institution requests \$2,000,000 to design the building. The Smithsonian will request funding for construction and equipping in subsequent years. Upon completion of the building in FY 1995, the Institution will relocate the Heye Foundation collection from its New York storage site.

Natural History East Court Building (\$1,500,000) - The Natural History Building on the Mall houses over 1,200 employees of the Smithsonian Institution and related agencies. Included in this number are 230 scientists and associated staff. Each year these individuals, along with over 3,000 visiting scientists, conduct basic collection-related research in a broad range of subjects critically important in advancing scientific knowledge and understanding of natural phenomena. In addition to the large force of scientific staff and other personnel, the Museum also houses huge collections, numbering well over 100 million specimens, and 30 public exhibition halls with major associated educational and outreach activities.

The Museum faces two enormous space challenges for the immediate future: accommodating a total building renovation of the heating, ventilating, and air-conditioning (HVAC) system and relieving tremendous overcrowding. The Museum proposes

to meet these two challenges by constructing a building inside the Natural History Building's East Courtyard.

Looking to the immediate years ahead, the Museum must deal with a complete renovation of the Natural History Building's aging HVAC system. This project, funded from the Repair and Restoration of Buildings account, also will include asbestos removal, window replacement throughout the building, and some work on fire protection and security systems. It is hard to imagine the disruptive magnitude and scope of this colossal project on the life of the Museum over the approximately 7-10 year period that it will be in process from beginning to end. The project will require enormous temporary dislocations. Nothing of its kind has been faced by the Museum since the Natural History Building first opened in 1910. The Museum will move large blocks of collections back and forth. The Museum will close entire exhibition spaces to the public in turn during the life of the project. Most occupants and virtually every activity will relocate temporarily. Given the extent and duration of the HVAC renovation, it is clear that everything possible must be done to minimize the impact, particularly on the scientific productivity of the Museum.

The second major space challenge that the Museum faces as it looks ahead is severe overcrowding. Today, the Natural History Building is filled to overflowing with staff and activities, far over reasonable capacity. Over the last 25 years, the Museum, in response to the enormous growth in scientific enterprise at large, has risen to meet major challenges such as the rapid destruction of the diversity of life in the tropics. The Museum has increased its efforts dramatically, enlarging its programs and staff. As a consequence, offices, laboratories, and collection spaces have been divided and subdivided into ever smaller spaces. Over the same years, the Museum closed four large exhibit halls indefinitely to help accommodate staff space needs. Two of them are being used as staging areas to prepare collections for transfer to the Museum Support Center (MSC) in Suitland. Meanwhile, collection and staff growth is such that the eventual moving of many collections to the MSC, much as this will help, will not relieve continuing space pressures. There will not be enough space available to accommodate all the staff functions in the building or to house under adequate conditions the diverse programs that the Museum is expected to serve.

Several alternative actions exist to cope with the lack of temporary space. To accomplish the temporary relocations for the HVAC renovation, the Museum must find substantial temporary space, either on-site or off-site. Leased space is unlikely to provide adequate conditions and facilities without becoming prohibitively expensive in direct costs and in the toll any off-site move would take on the academic and public life of the Museum.

The option of relocating on-site will require 125,000 square feet of staging space under the optimum 7-year plan for renovating the HVAC system. Closing down a major portion of the public exhibition space for the duration would impact on the visiting public.

After weighing the options, the Museum settled on the building proposal to resolve both space problems. The new East Court in-fill building would interconnect directly with the existing building and become an integral part of the whole Natural History Building.

The East Court Building will provide approximately 80,000 net square feet of relocation/staging space for offices, laboratories, and collections during the HVAC renovation project. Although this falls short of the estimated need of 125,000 square

feet for staging, the Museum can manage the necessary relocations by temporarily compressing some of the activities and collections within the Natural History Building and using a limited amount of exhibition space for the duration.

At the end of the HVAC construction period, the Museum will have 80,000 square feet of permanent space. This new space will allow for essential decompression of the currently overcrowded research laboratories, offices, collection areas, and public exhibit, education, and other outreach and Institution support activities. The preliminary cost estimate for the East Court Building is \$25 million, excluding the costs of furnishing and equipping the building. This estimate includes the cost of relocating the greenhouse, osteology preparation laboratory, and building trades shops now located in buildings presently in the East Courtyard.

The Institution will complete the necessary planning for the new building during FY 1990, using construction planning funds. The planning process will identify the program elements to be included, develop specific space and configuration requirements, and provide a more precise cost estimate and construction schedule. The Institution requests \$1.5 million in FY 1991 to design the new building. This funding will allow the Smithsonian to proceed with its plans to renovate the Natural History Building and will also provide valuable permanent space for the Museum's programs.

CONSTRUCTION PLANNING

An essential part of an effective facilities development program is the ability to assess requirements and make detailed long-range plans. A comprehensive long-range planning program identifies major issues affecting each expansion project, including program needs, spatial ideas, operating logistics and costs, and preliminary construction cost estimates. The Institution established an improved long-range planning capability with funds received in FY 1989. Staff will continue planning future projects with Construction Planning funds anticipated in FY 1990.

For FY 1991, the Smithsonian requests \$1,500,000 to continue development of a comprehensive long-range capital improvement program. This planning process will result in better defined plans for future year construction projects prior to authorization and budget requests. The Institution is currently considering a facilities expansion or improvement program that may total \$600,000,000 over the next ten years. Annual resources of \$1.5 million will provide continued feasibility studies, planning, and concepts upon which to base precise designs and cost estimates for construction. These resources will also establish operating and logistical support requirements and make required environmental assessments for critical capital improvement projects. This information will assist Smithsonian management decision-making and provide the basis for review commission and Congressional approval.

The absence of planning resources results in rough approximations of project requirements, such as space and configuration, construction and operational costs, and environmental and logistical factors. Such absence also results in capital improvement planning without coherence and unified direction. To avoid these problems, the Institution requests continued support for its long-range planning program.

MINOR CONSTRUCTION, ALTERATIONS, AND MODIFICATIONS

Projects in this category include:

- minor new construction (under \$1,000,000 in estimated cost);
- alterations and modifications to buildings to meet programmatic objectives in the areas of research, collections management, exhibitions, and public services.

For FY 1991, the Smithsonian requests \$5,540,000 for the projects described below.

Air and Space Building (\$300,000) - For FY 1991, the Smithsonian requests \$300,000 to finish renovating the vacated public cafeteria on the third floor. The opening of the new National Air and Space Museum restaurant on the east terrace in August 1988 freed this space for other activities. The Museum plans to move the Center for Earth and Planetary Studies into this space. The Center has grown significantly in recent years in response to increasing requests for information from the Museum, other scholars, the U.S. Government, and international agencies. The Museum will also use the space to consolidate public affairs, curatorial, and registrarial functions now scattered throughout the building. The Institution will use \$215,000 received in FY 1989 and \$320,000 anticipated for FY 1990 for design and construction required to provide more efficient workspace for the Center for Earth and Planetary Studies and to relocate the employee cafeteria. For FY 1991, the Smithsonian requests \$300,000 to alter space necessary to house the other consolidated functions.

American Art and Portrait Gallery Building (\$150,000) - For FY 1991, the Institution requests \$150,000 to complete installation of permanent storage racks in the attic of the Museum of American Art as part of a renovation begun in FY 1988. The space was formerly unusable for collections storage purposes because it lacked environmental control, and ductwork on the floor hampered access. Construction completed with previous funding rerouted the ducts across the ceiling, allowing more effective utilization of the space. The amount requested for FY 1990 will fund the framing required for installation of storage racks. For FY 1991, the Institution requests \$150,000 to complete this work.

American History Building (\$600,000) - For FY 1991, the Institution requests funds to continue two projects in the American History Building: mezzanine installation in exhibit halls, and the renovation of the conservation laboratory.

The long-range exhibit reorganization plan for the National Museum of American History (NMAH) calls for construction of a mezzanine system in various galleries on the first, second, and third floors of the building. The mezzanines will create space for study galleries in key exhibits, where visitors may view museum artifacts not normally on exhibit because of inadequate space. On the east side of the third floor, with \$103,000 received in FY 1987, the Museum constructed a mezzanine for the exhibit commemorating the Bicentennial of the Constitution. The Research Center in the present Dibner Library and Physical Science exhibit on the first floor is under construction with funds appropriated in FY 1988 (\$300,000) and FY 1989 (\$370,000). The Museum will use \$400,000 anticipated in FY 1990 to design and construct a mezzanine for the new first-floor "Information Age" exhibit. For FY 1991, the Institution requests \$400,000 for design and construction of a mezzanine in the third-

floor Photography Hall. The work will include fabrication and construction of basic steel and concrete galleries around the southern perimeter of the exhibit hall, along with necessary stairs, handicapped lifts, and railings.

For FY 1991, the Smithsonian requests \$200,000 to complete renovation of NMAH's conservation laboratory. The renovation will expand the laboratory for the conservation of costumes, textiles, and fragile organic materials. A laboratory for these requirements does not currently exist within the building. The Museum will convert space now used for a combination of collections storage and offices. The work will include installing sinks, cabinets, counters, fume hoods, and other equipment needed for conservation of these sensitive artifacts. The Smithsonian anticipates \$300,000 in FY 1990 to renovate and reorganize existing laboratory space to increase efficiency and to improve utilities, such as installing fume hoods and upgrading the water supply and electrical service.

Arts and Industries Building (\$300,000) - The Arts and Industries Building (A&I) houses four major exhibition halls. It also houses essential program and administrative activities on the Mall, including those that require public access, such as Public Affairs, Museum Programs, Elementary and Secondary Education, and the National Science Resources Center. Other central support organizations located in this building include Protection Services, Information Resource Management, Equal Opportunity, and Planning and Budget. There is an immediate and continuing need to renovate space to offer more functional work areas for current administrative and program requirements. The Institution will use funds provided in FY 1988 and FY 1989, and anticipated in FY 1990, to begin renovation of space and acquisition of modular furniture to increase future flexibility. For FY 1991, the Smithsonian requests \$300,000 to modify an additional 5,000 square feet. Funding for this ongoing project will support the Institution's efforts to use the space in the Arts and Industries Building efficiently.

Conservation Analytical Laboratory (\$375,000) - The staff of the Conservation Analytical Laboratory (CAL) has grown in the past few years and CAL plans to add additional professional staff, fellows, and interns. The present space at the Museum Support Center is inadequate for additional personnel. Conversion of the current seminar room and a portion of the auditorium area will provide the laboratory and office space needed for the new staff. The Institution anticipates \$20,000 in FY 1990 to design these alterations. For FY 1991, the Smithsonian requests \$375,000 for construction. The funds will install fume and exhaust hoods and laboratory sinks and cabinetry. The laboratory space will include specialized facilities for biogeochemistry and photoresearch. The project will also modify building ventilating, electrical, and plumbing systems serving the area. The funding of these changes will enable valuable research and conservation projects to proceed.

Cooper-Hewitt Museum (\$335,000) - For FY 1991 the Smithsonian requests funds for renovation of the McAlpin-Miller House and the newly acquired Fox House.

The McAlpin-Miller House is a five-story brownstone townhouse adjacent to the Carnegie Mansion, which houses the exhibits of the Cooper-Hewitt Museum. The Museum uses the building for offices and collections storage. The building is inefficiently laid out, and access to the collections stored there is difficult. The climate controls do not meet museum standards for storage of artifacts. The Museum will prepare a space study of the building with \$35,000 anticipated for FY 1990. This plan will integrate the renovation with mechanical, electrical, and plumbing repairs funded under the Repair and Restoration of Buildings account. For FY 1991, the Institution

requests \$75,000 for architectural changes to the building. This work will allow more efficient use of the space for the Museum's activities. Staff will have better access to the collections. Modifications will also delay the deterioration of the artifacts by improving the environmental control and other storage conditions.

The Cooper-Hewitt purchased the Fox House, next door to the McAlpin-Miller House, in 1989. This important acquisition will provide much-needed expansion space for the Museum. The Fox House was built in 1905 as a single-family residence and converted to apartments and professional offices in 1945. A number of residential tenants will remain in the building for the next few years. When the current leases are up, the Institution will renovate the entire building for full museum use. Meanwhile, the Museum must make a number of short-term changes to the unoccupied portions of the building. For FY 1991, the Smithsonian requests \$260,000 for this immediate work. The Museum will install appropriate security and fire protection systems and make minor architectural alterations. Without this funding, the Cooper-Hewitt cannot use the building to solve its most urgent space problems.

Freer Gallery Building (\$710,000) - The Institution requests funding for four projects at the Freer Gallery Building: the final phase of the courtyard and basement renovation, design of site work and landscaping modifications, installation of a telephone system, and design of auditorium renovation.

The Institution is currently renovating the Freer Gallery Building with funds appropriated or anticipated between FY 1986 and FY 1990. The project will excavate beneath the courtyard to construct additional collections storage and renovate basement space to provide an improved conservation laboratory. The work incorporates a number of repairs, including repairing the roof and some skylights, replacing the steam heating system, removing asbestos, and caulking and pointing the facade. The project also includes excavating and constructing the tunnel connection with the Sackler Gallery, using funds appropriated in the Construction account for the Quadrangle Complex. For FY 1991, the Institution requests \$540,000 to complete the project. The funds will support other changes and repairs to the building that were not anticipated until construction began. These include:

- replacing the courtyard waterproofing and applying new waterproofing;
- applying miscellaneous interior finishes;
- removing additional asbestos;
- modifying the South Lobby doors for handicapped access;
- removing cornices and installing lintels on new openings in the basement and the ground floor;
- repairing a number of mechanical and electrical components.

This work will progress most efficiently in FY 1991, while the Museum continues to be closed to the public.

The opening of the Kiosk entrance to the S. Dillon Ripley Center in the Quadrangle Complex resulted in increased pedestrian traffic in the area between the Freer and the Smithsonian Institution Building. For FY 1991, the Institution requests \$40,000 to design the modifications to the pedestrian circulation there. Changes will

include redirecting or upgrading the driveway and the walkways around the building and installing better signage for pedestrians. Landscaping improvements will provide better visual interplay between the Freer and the Castle. The Institution will request funding in FY 1992 for construction.

The Freer telephone system was completely removed during the early demolition phase of the renovation project. The Institution requests \$100,000 for design and installation of a new telephone system in the Freer Gallery Building. The new system will directly connect the interrelated staff of the Freer and the Sackler Galleries. The work will involve new conduit and wiring and new telephone equipment. The Institution will coordinate the installation of the new phone system with the ongoing renovation project.

The auditorium in the Freer Gallery Building is showing signs of age. The seat upholstery and carpeting is wearing thin, and walls and finishes are cracked and deteriorated. The projection booth is too small to accommodate the latest equipment and the lighting is inadequate. The \$30,000 requested will design the renovations needed to correct these conditions. The Freer will replace the carpeting and seats, restore or recover the plaster walls and ceiling, expand the projection booth, and install new lighting. The Institution will request funding in FY 1992 for these renovations.

Hirshhorn Building (\$25,000) - For FY 1991, the Institution requests \$25,000 to study changes to the gallery lighting system. The existing ceiling-mounted track lighting system provides little ambient lighting. The system lacks the flexibility to control lighting for individual galleries or specific art pieces. Exhibits staff cannot create the desired lighting effects to present the artwork to the best advantage. The Institution will hire a consultant to investigate state-of-the-art techniques in artwork lighting. The consultant will recommend changes to the lighting system. The Institution will use the consultant's estimate for future budget requests.

Museum Support Center (\$790,000) - For FY 1991, the Institution requests funds for four projects at the Museum Support Center: completion of a weather enclosure at the loading dock, completion of the Molecular Systematics Laboratory, installation of a greenhouse, and design of a lunchroom expansion.

The loading dock at the Museum Support Center (MSC) opens directly outdoors. This entrance is the sole access for most collections transferred from other locations for storage. Many of the artifacts shipped to MSC for storage are very delicate. Temperature and humidity changes contribute to rapid deterioration of these objects. To maintain the carefully monitored conditions under which they have been stored, the curatorial staff ships these artifacts in special environmentally controlled vehicles. The weakest link in the chain of environmental control is the MSC loading dock, where lack of a buffer zone exposes the artifacts to weather extremes and truck fumes and compromises the continuity of pest control. The Institution will use \$285,000 anticipated for FY 1990 to design and begin construction of an airlock enclosure around the loading dock area and the entrance to Pod 4. For FY 1991, the Smithsonian requests \$170,000 to complete the work. This enclosure will protect artifacts delivered to or loaded from MSC from exposure to weather conditions. The controlled environment within the enclosure will also reduce the chance for fluctuations in temperature and humidity within Pod 4, thereby conserving energy.

Congress provided funding in FY 1988 to establish a new program focusing on DNA molecular analysis. The Institution allocated space for this program at the Museum Support Center and will begin renovation of the space with \$150,000 anticipated in FY 1990. For FY 1991, the Smithsonian requests \$100,000 to complete the work. The project will install fume hoods, darkrooms, and workbenches and modify the electrical system. The new space will meet the standards normally associated with a biomedical facility and ensure safe working conditions for laboratory staff. The requested funding will permit this important research program to proceed.

The Institution also requests \$500,000 to construct a greenhouse at the Museum Support Center. The greenhouse will house living plant collections for anatomic, cytologic, taxonomic, and molecular systematics research for the Molecular Systematics Laboratory and the National Museum of Natural History's Department of Botany. Growing space in close proximity to the laboratories is vital to ongoing research programs. The Smithsonian will construct a 3,000-square-foot freestanding greenhouse. The heating and cooling system will provide full climate control and limit insect and pest intrusion. A system of walkways and entries will minimize the impact of staff movement on the controlled atmosphere. The greenhouse will enable a number of important research programs to continue.

The lunchroom facilities at the Museum Support Center cannot accommodate the numbers of staff now working there. The present lunchroom seats 50. Approximately 150 people now work at MSC, and this number will increase in the near future. Pest management requirements at the MSC restrict food preparation and consumption to the lunchroom area. The Institution requests \$20,000 to design an expansion to the lunchroom facility. The expansion of the lunchroom will ensure proper pest management at MSC and prevent the need for pesticides to maintain control.

Natural History Building (\$385,000) - For FY 1991, the Institution requests funding for two projects in the Natural History Building: completion of space suitable for the operations of a new national board and for receiving other advisors and dignitaries, and continuing modifications to spaces freed by the move of objects to the Museum Support Center.

In 1987, the National Museum of Natural History (NMNH) conducted an outside management study to assess its strengths and weaknesses and to identify ways to ensure its preeminence and success in the future. As a result, the Museum has begun to integrate and strengthen its exhibitions and public programming in relationship to its acknowledged strengths in scholarship. The Museum is in the process of hiring staff to initiate and complete the planning, funding, and construction of modernized exhibitions. The new exhibitions will replace decades-old ones in the Museum and will include related interactive educational activities.

The new director has established this emphasis on exhibitions and integrated programming as the highest priority for the Museum. A keystone to this emphasis is the establishment of a new national advisory board to provide guidance for this effort. The Museum must have appropriate space for the board-related activities. Unlike other major Smithsonian museums, the NMNH has never had a conference suite to accommodate national and international advisors, consultants, and other distinguished visitors and scholars, as well as for other public and staff gatherings. The Smithsonian anticipates \$700,000 for FY 1990 to design and renovate space for the expanded outreach activities of the new advisory body. For FY 1991, the Institution requests \$285,000 to complete the work. The project includes the construction of a conference room, kitchen, dining room, rest rooms, projection room, and reception

area. The suite will occupy about 5,000 square feet of space. If the space cannot be completed quickly, the Museum's efforts to improve exhibition offerings and outreach activities will suffer.

The continuing transfer to the Museum Support Center (MSC) of NMNH's collections presents a much-needed opportunity to reorganize and renovate the space within the Natural History Building to address the needs of growing programs. A major space problem in the building can be relieved only by relocating various functions after first reconfiguring the newly vacated space to optimize its use. Unless funding is made available to the Museum to continue the reconfigurations of space and relocations of functions in the Natural History Building as space is freed by the transfer of objects to MSC, severe crowding as well as inappropriate and inefficient use of space will continue to be a major problem. For FY 1991, the Institution requests \$100,000 to continue this work.

Photographic Services (\$50,000) - The Office of Printing and Photographic Services houses its collection of photographic negatives in the basement of the American History Building. Long-term preservation of the collection requires controlled temperature and humidity conditions. The present film vault is no longer large enough to accommodate the growing collection of negatives. With \$200,000 anticipated in FY 1990, the Institution will install a prefabricated environmental chamber and expand the vault into the adjoining corridor. The work will include electrical, mechanical, and plumbing modifications. The project will also remodel adjacent studio and laboratory space for greater working efficiency. For FY 1991, the Institution requests \$50,000 to complete the project. The Institution will use the funds to purchase and install special built-in equipment to make the new space fully functional. The request will eliminate substandard storage conditions.

Silver Hill Facility (\$75,000) - The collections storage buildings at Silver Hill, Maryland, cannot accommodate the current storage requirements of the National Air and Space Museum. The Museum has collected aviation and space artifacts over the past fifteen years, and the buildings are filled to capacity. Severely compressed storage in unstable environmental conditions damages these artifacts. For FY 1991, the Institution requests \$75,000 to design a pre-engineered building to relieve the overcrowded conditions. The new building will provide about 20,000 square feet of storage space, with proper environmental controls and fire and security safeguards. Although the Institution plans to construct a substantial storage facility for the Air and Space Museum at a nearby airport in the near future, this building will ease the immediate storage problem. When the Air and Space collections move to the new airport facility, the Institution will use the new Silver Hill building for other Institutional storage needs.

Smithsonian Astrophysical Observatory (\$130,000) - For FY 1991, the Institution requests \$130,000 for two projects at the Fred Lawrence Whipple Observatory in Arizona: design of an enclosure for the 10-meter reflector, and enclosure of the space beneath the Commons Building.

Scientists use the 10-meter optical reflector on Mt. Hopkins to study cosmic radiation. The reflector acts as a "light bucket" composed of 248 individually adjustable spherical glass mirrors. The original construction, completed in 1968, did not include a dome over the reflector because planners did not know whether the telescope would have a long useful life. The instrument has proved exceedingly effective, however, and it will remain in use for the foreseeable future. A removable shelter will protect the mirror surfaces from damage by sand and weather, reducing

maintenance costs of the equipment. The design of the proposed enclosure will cost \$30,000. The Institution requests this amount in FY 1991 and will request funding for construction in a future year. The addition of a protective enclosure will reduce maintenance costs for this important piece of equipment and expand its useful life.

For FY 1991, the Institution also requests \$100,000 to enclose the space under the Commons Building, the dining and recreation facility located just below the Multiple Mirror Telescope, used by all staff who must stay on the mountain over extended periods to conduct research. A basement level was not included during original construction in 1980. Now, with the acute need for additional space in the summit area, enclosure of the basement is a cost-effective solution. The new basement will include workrooms for staging of the Multiple Mirror Telescope conversion and a remote control room for the new Infrared Optical Telescope Array. These new workspaces are crucial to the operations of these important astrophysical research programs.

Smithsonian Environmental Research Center (\$400,000) - The Smithsonian Environmental Research Center (SERC) at Edgewater, Maryland, performs basic scientific research on coastal land and water systems. Its 42,000 square feet of laboratory, office, educational, and support space occupies several buildings on 2,600 acres of tidal river system land. SERC also rents space in Silver Spring, Maryland, for its solar radiation laboratory. The owner of this building plans to sell it in the near future. SERC must construct additional laboratory space at the Edgewater facility to accommodate this important program. For FY 1991, the Institution requests \$400,000 to add laboratory "modules" to the newly completed Mathias Laboratory building. Construction of laboratory space will avoid additional disruption of this valuable research program. Consolidation of the laboratory with the rest of SERC activities will also save operating costs and benefit administrative and academic communications.

Smithsonian Institution Building (\$100,000) - The Smithsonian Institution Building houses the Office of the Secretary and other senior management of the Institution. Recent changes in the use of the building require minor modifications to the building to provide the necessary support facilities for staff activities. For FY 1991, the Institution requests \$100,000 for this work to ensure the efficient operation of these key organizations.

Smithsonian Tropical Research Institute (\$630,000) - For FY 1991, the Institution requests funding for three projects at the Smithsonian Tropical Research Institute (STRI) in Panama: constructing staff housing on Barro Colorado Island, modifying the Ancon Building at Tivoli, and designing new laboratory and support facilities at the Gamboa research site.

The 1986 STRI Master Plan calls for construction of additional housing for staff and workers supporting research programs on Barro Colorado Island (BCI). The Institution is using \$895,000 appropriated in FY 1985 to construct 20 staff units in five buildings and a laundry/lounge building. These facilities are currently under construction. For FY 1991, the Smithsonian requests \$500,000 to build additional facilities to house the full complement of staff and workers living on the Island. The funds will construct an additional staff residence and a workers' residence. The staff residence will house two scientists who must live on the Island to conduct their research and provide overall administrative coordination to scholars working there. The workers residence will house eight workers and game wardens who provide important operational support to staff and research activities. The new residences will provide safe, efficient, and comfortable accommodations to those working on the Island.

STRI plans to relocate its administrative headquarters from the Ancon Building to the nearby Tupper Laboratory and Conference Center. The Institution will renovate the Ancon Building to provide dormitory and laboratory space for short-term visiting scientists. For FY 1991, the Smithsonian requests \$45,000 for this work. The funds will convert the second floor into bedrooms and the ground floor into a series of laboratory-office suites. STRI will coordinate this project with roof repairs and utility upgrading work funded from the Repair and Restoration of Buildings account. Conversion of the Ancon Building will allow the most effective use of this well-located facility.

The Soberania National Park is the most accessible moist forest in Central America and northern South America. The Gamboa site adjacent to the Park offers opportunities for research on habitats and species not present at BCI. The STRI Master Plan calls for new laboratory and support facilities at Gamboa. For FY 1991, the Institution requests \$85,000 to design the proposed facilities. The 2,800-square-foot laboratory will include ecology and chemistry laboratories, offices, and support spaces. An adjacent vivarium and insectary will provide vital space for live specimens. A maintenance shop with emergency generator will house maintenance equipment, materials, and fuel. Realization of the full potential of research opportunities available in the Soberania National Park depends greatly on provision of laboratory and support facilities in the immediate area.

Alterations and Modifications Planning (\$185,000) - For FY 1991, the Smithsonian requests \$185,000 to plan future minor construction, alterations, and modifications projects. As in other categories of construction activities, such as Major Construction and Repair and Restoration of Buildings, planning is an essential ingredient of an effective facilities management program. These resources will allow the Institution to assess future requirements for minor changes to existing facilities to accommodate programmatic growth and changes in program direction. Planning studies will evaluate space requirements, make engineering analyses, prepare concept designs for buildings and sites, and estimate total project costs. Careful research into these future needs will result in more accurate cost estimates in advance of budget requests.

COLUMBUS QUINCENTENARY PROGRAMS

The Smithsonian's Columbus Quincentenary Program will commemorate the voyages of Columbus and the subsequent encounter between Europeans, Africans, and indigenous peoples of the Americas. Through a program of exhibitions, scholarly and public symposia, and publications, the Smithsonian will examine the cultural, historical, and scientific implications of the hemispheric encounter.

One of the major goals of the Institution's program is to highlight the experiences and contributions of all peoples affected by the Columbus landfall. Through the multi-disciplinary perspectives of various bureaus taking part in Quincentenary activities, the Smithsonian will offer a broader interpretation of the history of the Americas than the traditional Euro-centric view. Descriptions of the activities of the participating bureaus follow:

Cooper-Hewitt Museum: The Cooper-Hewitt Museum will present an exhibition on maps and the age of exploration in the spring of 1992.

Hirshhorn Museum and Sculpture Garden: The Hirshhorn Museum and Sculpture Garden will feature an exhibition of works by four 20th-century Latin American artists who have explored new frontiers of expression.

National Air and Space Museum: By October 1992, the National Air and Space Museum will produce a world atlas based on satellite images and publish a user's guide to the atlas. In addition, an exhibition titled "Where Next, Columbus?" will examine space exploration in the next 500 years, the solar system, the search for extraterrestrial life, and other social and scientific programs that are a part of extensive exploration.

National Museum of American Art: The National Museum of American Art (NMAA) is organizing an exhibition titled "The West as America: 1820-1920." Through major paintings of the mid and late 19th century, the exhibition will examine the myths that fomented a national bias for expansion. NMAA is collaborating with the National Portrait Gallery on a FY 1993 exhibition based on American paintings and sculptures originally shown in the 1893 World's Columbian Exposition in Chicago.

National Museum of American History: The National Museum of American History has three components to its Columbus Quincentenary program: an annual series of small exhibitions and accompanying public forums, a series of public programs in Hispanic-American history, and a major permanent exhibition titled "American Encounters" which will open in October 1992. "American Encounters" will focus on the encounters among European, indigenous, and African-American cultures in the United States during the 17th, 18th, 19th, and 20th centuries. This exhibition will emphasize the northern rim of Spanish America and the development of Hispanic culture in the United States.

National Museum of Natural History: The National Museum of Natural History is planning a major exhibition organized around the concept "Seeds of Change." The exhibition, opening in October 1991, will look at plant, animal, and disease exchanges occurring between the Old and New Worlds that transformed the cultural and ecological landscape of the Americas. Scheduled for November 1989, "Changing Patterns of Disease and Demography in the Americas Before and After 1492," this symposium will examine issues concerning native population estimates and the controversies among scholars who are researching native-American demographic decline.

National Portrait Gallery: The National Portrait Gallery (NPG) is developing an exhibition of the portrait treasures of Spain with the Kimbell Museum in Fort Worth, Texas, and the Prado Museum in Madrid. The exhibition will present more than 50 works

by artists during the 16th-century reign of Philip II. In FY 1993, NPG will present, in collaboration with NMAA, an American painting and sculpture exhibition based upon the 1893 World's Columbian Exhibitions in Chicago.

Office of Elementary and Secondary Education: The Office of Elementary and Secondary Education (OESE) will develop a series of multi-cultural education packets written in English, Spanish, and Portuguese. The packets will introduce preschool age children to the cultural and animal life of the Americas. In addition, OESE will develop curriculum materials around the themes of a special Quincentenary television series. A three-part program sponsored by OESE in FY 1991 will include a symposium on the effects of cultural transplantation--from Latin America to the United States--on the folk art traditions of story telling, textile arts and music; a video of the symposium; and a special issue of Art to Zoo which will show how teachers may use their communities' multi-cultural resources for teaching about Latin America.

Office of Folklife Programs: The Office of Folklife Programs is presenting a series of three symposia exploring social and cultural expressions that emerge from the production of important crops and subsistence systems in the New World. In September 1988, the Office presented the first symposium, "Seeds of the Past," which focused on indigenous crop systems and on the social and cultural expressions arising from their production. In February 1989, "Seeds of Commerce" dealt with social and cultural expressions resulting from the development of commercial crops, such as sugar, coffee, and tobacco in the Caribbean area. The third symposium in FY 1990, "Seeds of Industrialization," will deal with the social and cultural expressions arising from the industrial uses of plants. The symposia will lead toward "living museums" of Caribbean peoples and indigenous Americans who practice traditional lifestyles, including music, storytelling, and crafts. The "living museums," scheduled for presentation during the FY 1991 and FY 1992 Folklife Festivals, will focus on the interplay of native-American, African, European, and Asian people in the Americas. Additional products that will result from the symposia and "living museums" include publications, Smithsonian radio programs, sound recordings, and films.

Office of Public Affairs: The Office of Public Affairs will promote Smithsonian Quincentenary activities through print, media publications, television, public service announcements, and radio advertisements.

Office of Quincentenary Planning: The Office of Quincentenary Planning (OQP) provides Institution-wide planning and central support for the broad range of programs commemorating this international anniversary. OQP is developing curriculum materials based on the September 1987 symposium "America before Columbus: Ice Age Origins," to teach children and adults about the first humans in North America. The Smithsonian Institution Press will publish the proceedings of "Musical Repercussions of 1492," a March 1987 symposium examining the America's diverse musical history. On May 5-6, 1989, a symposium titled "Violence and Resistance in the Americas: The Legacy of Conquest" examined the foreign imposition of legal, literary, philosophical, and religious systems on indigenous cultures and the effects of those pressures. In spring 1990, OQP will sponsor a public symposium entitled "Women in the Americas: Myth and Reality." Also planned is a hemispheric teleconference on the exploitation of cultural and natural resources, using the Andean region of South America as a case study.

The American Indian Outreach Program of OQP will develop an exhibition on ethnobotany that will tour native-American reservations, schools, and community centers. The Office is also developing a newsletter to publicize the Smithsonian's

Quincentenary research, planning, and programs. OQP will publish the newsletter quarterly in English, Spanish, and Portuguese and will distribute it internationally.

Smithsonian Institution Press: The Smithsonian Institution Press is publishing a three-volume series, entitled the Columbus Consequences. The series will address the social, demographic, ecological, and ideological impact of Columbus's landing. Scheduled for publication prior to the 1992 observances, the project explores early European/native-American interaction of Spanish colonial settlements in the New World.

Smithsonian Institution Traveling Exhibition Service: The Smithsonian Institution Traveling Exhibition Service will design and distribute traveling versions of several exhibitions. Among them are versions of the International Gallery's "Tropical Rainforests: A Disappearing Treasure" and the National Museum of Natural History's exhibition "Seeds of Change."

Smithsonian Tropical Research Institute: The Smithsonian Tropical Research Institute (STRI) will co-sponsor an international symposium on "Non-Imperial Politics" which will allow experts in the fields of archeology, paleo-environmental studies, and ethnohistory to share their research. STRI will also host the Fourth World Congress on National Parks for the International Union for Conservation of Nature and Natural Resources in Panama in 1992 to commemorate the Columbus Quincentenary.

Other Quincentenary Activities: Other events include a public symposium "Exploring the Unknown," sponsored by the Office of Interdisciplinary Studies, and the Office of Museum Programs will conduct training sessions for museum professionals from Latin America and the Caribbean. In addition, several Smithsonian bureaus are collaborating on a six-part television series, "The Buried Mirror," written and narrated by Mexican author Carlos Fuentes, which will examine Spanish and indigenous contributions to the Americas and the emergence of "new cultures" in both historical and contemporary contexts. The Resident Associate Program and the National Associate Program also plan various Quincentenary activities.

The accompanying table identifies Federal funding appropriated in FY 1989 (see table), estimated in FY 1990 and requested for FY 1991 to support Columbus Quincentenary programs:

SMITHSONIAN INSTITUTION
FEDERAL FUNDING FOR COLUMBUS QUINCENTENARY PROGRAMS
FY 1989 - FY 1991

	FY 1989 Approp. <u>-----</u> \$000s	FY 1990 Estimate <u>-----</u> \$000s	FY 1991 Request <u>-----</u> \$000s
National Museum of Natural History	130	130	230
National Air and Space Museum	41	41	50
National Museum of American History	125	125	375
National Museum of American Art	25	25	51
National Portrait Gallery	15	15	65
Hirshhorn Museum and Sculpture Garden	20	20	70
Cooper-Hewitt Museum	24	24	24
Smithsonian Institution Traveling Exhibition Service	55	55	55
Smithsonian Institution Press	0	0	20
Office of Quincentenary Planning	50	50	150
Office of Folklife Programs	90	90	240
Office of Elementary and Secondary Education	38	38	22
Smithsonian Tropical Research Institute	0	0	60
Office of Public Affairs	0	0	36
	<u>-----</u>	<u>-----</u>	<u>-----</u>
Total Smithsonian Institution	613	613	1,448

SMITHSONIAN INSTITUTION
MUSEUM PROGRAMS AND RELATED RESEARCH
(SPECIAL FOREIGN CURRENCY PROGRAM)

1989 Appropriation.....	-0-	—	
1990 Appropriation.....	-0-	--	Equivalent in Excess
1991 Estimate.....	-0-	—	Foreign Currencies

PROGRAM OF GRANTS FOR RESEARCH

The Smithsonian Institution, through its Special Foreign Currency Program, makes grants to United States universities, museums, and other institutions of higher learning, including the Smithsonian itself, primarily for research and advanced professional training in fields of traditional Smithsonian competence.

Excess currencies appropriations directly funded the Program through FY 1986. Outlays from the budget authority appropriated through FY 1986, including the Forward-Funded Reserve for the American Institute of Indian Studies, will continue into the mid-1990s. In addition, since FY 1986, the Smithsonian has received allocations of U.S.-owned Indian rupees from the funds appropriated to the Department of State in FY 1985 for the establishment of the U.S.-India Fund for Educational, Cultural, and Scientific Cooperation. (OMB Bulletin 89-01, issued on October 3, 1988, indicates that the Secretary of the Treasury has designated Burma as an excess currency country for FY 1989 and FY 1990.)

For more than 20 years, the Special Foreign Currency Program has been a major source of support for research carried out by United States institutions in those countries for which excess foreign currencies are available. The full responsibility for the design, execution, and publication of research results rests with a scholar working within the program of a United States institution. Smithsonian foreign currency grants strengthen the research and training activities of collaborating institutions abroad, since most projects directly involve host country institutions and scholars. Enduring professional ties, which result from joint efforts and scholarly exchange, contribute to the strongest form of United States cultural relations with other nations. These ties also contribute to the integration of the worldwide advancement of science. Accordingly, they narrow the gap between the industrial and the developing nations. Moreover, research sponsored by the Program, aims, in part, at improving understanding of the environment and the management and conservation of scarce natural and cultural resources that are threatened by the rapid growth of world population and technological development.

In FY 1989, ongoing research supported by these grants included the following projects of special interest:

- archeological and geomorphic studies at Harappa in Pakistan that provide new information on the prehistoric settlements of the Lower Indus valley;
- an ongoing exchange between Indian and United States astronomers that answers questions in the application of nuclear, elementary, and relativistic physics to astrophysics;
- comparative studies of dance orientation and vision in Asian honey bees that offer new perspectives on how bees and other insects process visual information in orienting their movements;

- an exchange between United States and Pakistani folklorists, anthropologists, and linguists that gives Pakistani researchers access to current Western research techniques in music, foodways, language, and art;
- examination of archeological sites in Burma that clarifies the importance of Burma in the early formation of regional styles of art and architecture in Southeast Asia.

Further, with emphasis on the exchange of information through small workshops, symposia, and field conferences, the Program encourages international research in specialized areas. In FY 1989, for example, United States scholars received support for participation in exchanges on the subjects of astronomy, environmental education, sociology, soil zoology, Rajasthani studies, visual anthropology, and zoo management.

FORWARD-FUNDED RESERVE FOR THE AMERICAN INSTITUTE OF INDIAN STUDIES

Since 1967, the Smithsonian has provided annual funding through the Special Foreign Currency Program to the American Institute of Indian Studies (AIIS) for its fellowships, research, symposia, and publications programs, as well as its administrative costs. The Smithsonian has helped sustain this Institute and other American research centers abroad for the last 20 years because of their significant contributions to scholarship and science without regard for national boundaries and because of their special service to American scholars.

With Special Foreign Currency Program funding received from FY 1980 through FY 1985, the Smithsonian established a forward-funded reserve of \$7,170,000 equivalent in rupees. This reserve enabled the AIIS to sustain its programs after the removal of India from the excess currency list in 1985. Since FY 1986, AIIS, with oversight from the Smithsonian, has drawn upon the funds from this reserve for its fellowship program and administration costs in India. The Institution continues to examine annual proposals through its peer review system before releasing funds from the reserve account to AIIS. The reserve should support AIIS programs through the 1990s in conjunction with continued support from the U.S.-India Fund.

U.S. - INDIA FUND FOR EDUCATIONAL, CULTURAL, AND SCIENTIFIC COOPERATION

In FY 1985, Congress appropriated \$110 million equivalent in U.S.-owned Indian rupees to the Department of State to establish the U.S.-India Fund for Educational, Cultural, and Scientific Cooperation. Since FY 1986, the Smithsonian has received allocations from this fund to continue programs in India similar to those administered under the Special Foreign Currency Program, which would otherwise have ended when India lost excess currency status in 1985. The Institution received an amount of \$1.4 million in FY 1986, \$1.5 million in FY 1987, \$1.8 million in FY 1988 and \$1.75 million in FY 1989. It expects an amount of \$2.5 million for FY 1990.

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